

Summary Report: Analysis of Brexit Scenario Impacts on Scottish Agricultural Sectors

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SUMMARY REPORT: ANALYSIS OF BREXIT SCENARIO IMPACTS ON SCOTTISH AGRICULTURAL SECTORS

FOR



BY

ANDERSONS

WITH SUPPORT FROM



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Please Note:

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EXECUTIVE SUMMARY

With the UK leaving the EU and the end of the Transition Period in December 2020, there will be significant impacts on all sectors of the Scottish economy, especially agriculture. This study has quantified the impact of Brexit on selected Scottish agricultural sectors namely: cereals (wheat and barley); livestock (dairy, beef and sheep); and horticulture (potatoes, cauliflower/broccoli and strawberries). This has been done using two scenarios, a Free Trade Agreement (FTA) and a No Trade Deal (No Deal) versus the Baseline of the UK continuing as an EU Member State. The research has been undertaken using a combination of Agmemod, a partial equilibrium economic model, desk-based research and industry interviews.

Assessments were also undertaken on the impact of tariffs, non-tariff measures (NTMs) and tariff rate quotas (TRQs) on future UK-EU trade patterns. These served as inputs to the Agmemod modelling which was undertaken with support from Wageningen University and Research (WUR) to assess Brexit impacts on wheat, barley, beef, sheepmeat and the dairy sector. These modelling results were then used in conjunction with additional analyses on horticulture to ascertain the impact of Brexit on UK and Scottish agricultural output and farm-level performance in Scotland.

Overall Results

- **Relatively small impacts in an FTA but substantial changes projected in a No Deal:** as Tables A and B show, a UK-EU FTA would lead to minor changes in Scottish output, even in the longer term. Under a No Deal, the impacts are much more substantial and lasting. The degree of impact in each sector under a No Deal depends on the UK's net trade position.
 - **Export reliant sectors:** such as barley, sheepmeat and seed potatoes (all important in Scotland), are projected to see a decline in the value of output. For barley and sheepmeat, such declines would be substantial, projected at 10-29% respectively in the short-term and 17-36% in the long-term.
 - **Import dependent sectors:** where the UK is a net importer, such as dairy (liquid milk) and beef, sizeable increases in the value of output are projected over the long-term, ranging from 14-19% respectively. For horticulture, aside from seed potatoes, the other sectors tend to be dominated by imports and are projected to grow by over 5% under No Deal. However, as outlined below, this is heavily contingent on sufficient labour availability.
 - **Wheat:** as its net trade position is more marginal, a small output increase is projected, chiefly due to the relative decline of profitability in barley production.

Table A: Agmemod Projections of Brexit Impacts on Selected Scottish Farm Sectors (£m)

Sector / Commodity	2017-19 Base	FTA 2021		FTA 2025		No Deal 2021		No Deal 2025	
	£m	£m	% Ch						
Wheat	121	121	0.0%	121	0.0%	123	2.0%	127	5.3%
Barley	269	269	0.0%	269	0.0%	241	-10.3%	222	-17.4%
Beef	575	581	1.1%	582	1.3%	672	16.9%	683	18.8%
Sheepmeat	213	215	1.0%	216	1.2%	152	-28.5%	137	-35.8%
Liquid Milk	384	386	0.6%	386	0.6%	440	14.6%	439	14.3%
Sub-Total	1,562	1,573	0.7%	1,574	0.8%	1,629	4.3%	1,608	2.9%

Sources: Andersons, WUR and Scottish Government

Table B: Short-Term Estimated Impacts of Brexit on Selected Scottish Horticultural Enterprises

Sector / Commodity	2017-19 Base	FTA 2021		No Deal 2021	
	£m	£m	% Ch	£m	% Ch
Seed Potatoes*	76	75	-1.9%	73	-4.6%
Potatoes – Ware*	146	147	0.6%	155	5.9%
Cauliflower*	6	6	1.6%	6	5.6%
Broccoli*	10	10	1.6%	11	5.6%
Strawberries*	95	95	0.2%	100	5.3%
Sub-Total	333	333	0.0%	345	3.6%

Sources: Andersons, WUR and Scottish Government

* **Note:** Horticultural enterprises were not modelled using Agmemod, estimates are for 2021 only based on tariff and NTM price changes applied to 2017-19 output.

- **Overall Output rises in both Brexit scenarios in the short-run and long-term:** across all sectors examined in this study, output is forecast to rise marginally (by 0.6%) in an FTA scenario and by 4.1% under No Deal, These shifts, particularly in the FTA scenario, are well within the ranges witnessed in previous years just from weather, commodity and exchange rate shifts. For the sectors modelled via Agmemod, the short-term rise from a No Deal is 4.3% (vs 0.7% (FTA)). In 2025, No Deal gains dissipate somewhat to 2.9%, mainly driven by further declines in the sheepmeat and barley sectors.
- **FTAs with third countries or generous new TRQs will erode output gains:** although this study did not specifically model the impact additional FTAs which the UK might agree with other non-EU countries, it is evident that any additional exposure to global competitors whose cost bases are lower and operate to different standards, will exert pressure on Scottish producers. Importantly, it was also assumed that the UK's existing standards (i.e. aligned with the EU's) were still in place. As such, there were still linkages with the EU market. Changed standards as a result of new FTAs would mean greater exposure to world market prices and an erosion of domestic prices, lowering output considerably. This would be most prevalent in beef but likely to have some effects on dairy products as well. Furthermore, if the UK introduces generous new TRQs (i.e. of a quantity greater than the UK's net imports with the EU), then Scottish producers will face greater competition from world markets and domestic output would reduce significantly as a result.

Other Key Findings from Economic Modelling:

- **Changes in an FTA scenario are primarily due to Non-Tariff Measure (NTM) costs:** The NTM costs, to the sector as a whole, estimated in this project are summarised in Table C. The ranges in each scenario encompass both EU27 to UK and UK to EU27 trade. These NTM costs tend to be lower than previous studies. This is partly because the NTM estimates are predicated on the UK's standards being the same as the EU's. Therefore, the costs of obtaining regulatory approval from the EU Commission (at both the country and plant levels) have not been included as it is anticipated that such approval will be given initially, even under a No Deal scenario. Furthermore, the physical check rates for some products (e.g. beef) under a No Deal are set to decrease from 20% (used in some previous studies^{1,2}) to 15%. Although in specific cases such as loads being subject to the full range of physical checks, AVEs often surpass 25% in a No Deal scenario. Any future divergences in standards between the UK and the EU are likely to lead to increases in NTM costs as such products will be subject to greater more scrutiny by both customs (HMRC) and authorities focusing on Sanitary and Phytosanitary (SPS) issues.

Table C: Average Cost to the Sector of NTMs by Commodity (Ad-Valorem Equivalent (AVE) %)

Sector / Commodity	FTA	No Deal
Wheat	0.1%	0.1%
Barley	0.1%	0.1%
Beef (carcasses only)	1.2 – 2.9%	2.2 – 5.0%
Sheepmeat (carcasses only)	0.9 – 2.0%	1.8 – 3.4%
Dairy - Butter	0.8 – 1.1%	1.5 – 1.8%
Dairy - Cheese	1.1 – 1.7%	1.9 – 2.7%
Seed Potatoes	2.1 – 5.6%	3.0 – 7.1%
Potatoes – Ware	1.3 – 5.3%	1.7 – 7.2%
Cauliflower / Broccoli	2.1 – 2.3%	2.9 – 3.2%
Strawberries	0.4 -0.8%	0.6 – 1.1%

Sources: The Andersons Centre

- Limited UK access to EU markets via TRQs would continue under a No Deal:** this should permit UK wheat exports to continue (albeit with a €12/t in-quota tariff which will inhibit competitiveness on EU markets) as the UK will be competing with other third countries to get access to the EU27 market via TRQs. Some exports of beef would also continue but such UK exports would be subject to conditions (e.g. would have to be frozen) and 'in-quota' tariffs. However, access for sheepmeat would be negligible. Table D summarises the access that UK exporters would have to the EU via TRQs and also sets-out the access that EU27 exports to the UK would have in a No Deal scenario. A new TRQ for UK beef imports (196Kt) is assumed under a No Deal scenario. This reflects the net trade position on UK-EU trade but would be available to all third countries which can meet the UK's standards. Therefore, EU27 producers would have to compete with non-EU countries. However, as imported volumes would be limited, it would safeguard UK domestic producers to a significant degree. That said, if the UK were to announce substantially different TRQ's there would likely be substantial impacts on the results for the beef, and dairy sectors in particular.
- Minimal consumption changes in an FTA, but some reactions to No Deal price effects:** whilst the prices used in Agmemod relate to the farm-level, it permits some inferences to be made about consumer reactions to Brexit-related shocks. The results suggest that the biggest consumer reaction occurs with lamb where the No Deal farm gate price projected by Agmemod declines (26-27%) leads to a significant (35-36%) upturn in domestic usage. This reaction is also aided by consumers switching away from other meat products such as beef, pork and poultry which would become more expensive under No Deal. Beef and dairy products post relatively small consumption declines in reaction to No Deal price increases. The pronounced lamb reaction is also due to relatively low UK consumption which currently equates to about a fifth of beef consumption and a tenth of poultry meat domestic usage.

Table D: Potential Access for UK Exports to the EU and EU Exports to the UK under TRQs

Commodity	Available to Imports from EU27	Available to UK Exports to EU27	In-Quota Tariff (For Imports & Exports)	EU Common External Tariff
Based on allocation of existing EU28 TRQs (which will also be accessible by other Third Countries)				
Wheat (all types)	85,935	2,715,242	€12/t	€95/t (feed)
Feed barley	293	306,812	€12/t	€93/t
Malting barley	30,101	20,789	€8/t	€93/t
Skimmed-milk powder	0	68,537	€475/t	€1,254
Butter	27,516	47,177	€948/t	€1,896/t
Cheddar cheese	64	14,941	€210/t	€1,671/t
Beef & Beef Offal	55,098	64,280	4 – 20%+ (frozen only)	12.8%+€1,768 (carcase beef)
Sheepmeat*	22	378	0%	12.8%+€1,713 (lamb carcasses)
Potatoes (fresh) (Supplied Jan-Jun)	3	4,295	3%	9.6%
New UK TRQ* (No Deal scenario only)				
Beef	196,000	0	0%	12.8%+€1,768 (carcase beef)

Source: European Commission

* **Note:** this new UK TRQ has been assumed under the core No Deal scenario (and does not apply in the FTA scenario). It reflects the UK's net trade position with the EU but would be available on an 'Erga Omnes' basis (i.e. to all third countries (EU and Non-EU) meeting the UK's standards.

- **Impacts on farm-level profitability:** Table E shows the short-term profitability impacts under both scenarios (i.e. longer-term 'responses' by farmers are not factored into consideration). Given the Agmemod results above, it is unsurprising that dairy and beef farming become more profitable under both scenarios. In an FTA where declines in sheepmeat prices are small, margins in both LFA and Lowland farms improve. Under No Deal, margins on LFA cattle and sheep farms deteriorate markedly due to price falls in sheepmeat. Lowland farms continue to see improved margins but that is heavily reliant on beef prices remaining high. Margins on Scottish cereals farms deteriorate under both scenarios due to the impacts on barley, where significant losses are projected under a No Deal.

Table E: Impact of Brexit Scenarios on Farm Business Income Excluding Diversification

Sector	18/19 (Base)	FTA (2021)	% Ch.	No Deal (2021)	% Ch.
Cereals	45,600	44,000	-3.6%	36,400	-20.1%
Dairy	70,700	71,400	1.0%	124,300	75.7%
LFA Cattle & Sheep	23,200	23,600	1.7%	17,600	-24.2%
Lowland Cattle & Sheep	9,600	10,100	5.6%	15,200	59.2%

Sources: Scottish Farm Business Survey, Andersons

Note: Figures are rounded to the nearest £100

- **Inflationary pressures will rise for imported inputs from the EU27:** trade barriers will exert inflationary pressures, particularly on farm-level inputs as it takes time for supply-chains to adapt to regulatory changes. Provision has been made for increases in input costs in the farm-level modelling. With tight industry profit margins, it is likely that much of the additional costs will be passed on to consumers and/or farmers. The degree to which Scottish farms could absorb such costs is limited. If

farmers bear the brunt of price pressures, a significant proportion could be squeezed out of farming under a No Deal, especially in sheep and barley production.

- **Labour:** if Free Movement ends and seasonal labour costs rise by 15% (or more), then margins in the horticultural sector are projected to fall considerably. The ending of Free Movement will also affect other farm sectors but as labour costs tend to account for a lower proportion of overall production costs, such increases are less noticeable.

Additional Primary Research Findings

Whilst the main thrust of this report focused on economic modelling, several notable points also emerged from the primary research which are briefly summarised as follows;

- **If seasonal labour is unavailable, many horticultural enterprises will become unviable:** several interviewees stated that without seasonal labour, many horticultural enterprises will simply be unable to operate. Several emphasised the need for an expanded Seasonal Agricultural Workers' Scheme. Across the UK, this needs to be in the region of 70,000 workers, with over 9,250 seasonal workers needed in Scottish horticulture alone.
- **Uncertainty about future border arrangements:** remains amongst many businesses, despite recent announcements by Defra and other Government agencies, especially for trade into Northern Ireland where border controls are set to be in place from January. There are also concerns elsewhere, especially on the Dover-Calais route. Issues include whether products such as chilled mince and sausages will be permitted for cross-border trade and whether the various customs systems (e.g. Goods Vehicle Movement Service (GVMS)) are adequately tested. Interviewees emphasise that detail is urgently needed from the UK Government on these arrangements. The general view is that although the Transition Period might end in December, a further 6 month phase-in period is needed. If these issues are not addressed, then significant upheaval will ensue in the first few months of 2021 and could result in the loss of key markets for perishable produce particularly.
- **Non-EU markets insufficient to replace EU export markets:** as Scotland is a high-quality (and high-cost) producer, most industry experts believe opportunities for meat and dairy products are likely to be limited to niche markets such as Japan. They believe that this will not replace the significant value of exports to key EU markets if these are lost under No Deal. Taking sheepmeat for instance, around 95% of UK exports are to the EU. Under a No Deal exports are projected to fall by around 46% in the long-term. Given the time required to build new markets, distances involved and the competition from countries such as New Zealand, increased exports to these markets will not compensate for the loss of sales to the EU27. The industry view is that non-EU markets are bonus opportunities, but that safeguarding Scotland's share of the UK market and exports to the EU need to be prioritised.
- **The importance of the UK Internal Market:** was emphasised numerous times during the primary research. Several interviewees mentioned that Brexit should present opportunities to serve a greater proportion of the UK market, but this would be marginal in an FTA scenario. A No Deal would present greater opportunities for Scottish producers to increase sales in the UK Internal Market where Britain is a net importer. However, there are fears that the protection offered by the UKGT (which most participants operating in sectors reliant on imports welcomed) will be undermined as and when the UK signs new FTAs. For sectors reliant on exports (e.g. sheepmeat) any imposition of tariff barriers on UK-EU trade raises major concerns given the corrosive impact such tariffs would have on output.
- **Coping with divergences in agri-food standards will be a delicate balancing act:** several interviewees expressed concern that future changes to standards will make it more difficult for Scottish producers to compete, thus limiting domestic market opportunities even further. Some also expressed the view that Scotland should not simply follow EU standards if this meant that its

competitive position in the rest of the UK was undermined. This suggests that there is an important balancing act for the Scottish Government to ensure that current standards and reputation of Scottish produce is upheld whilst not undermining its position in both the British and EU markets.

- **Disproportionate impact on SMEs:** which tend to have higher operating costs and dispatch fewer loads than their largescale peers. As such, the risks posed by trade barriers would have a greater impact on their bottom-lines, meaning that it is more likely that such businesses would stop trading internationally. In some cases, this could have a major impact on their competitiveness and viability.

Final Remarks

Scottish farming stands on the cusp of the most significant change in generations. As the Brexit Transition Period ends, there will be significant changes to Scotland's trading relationship with the EU (and NI). These can be minimised via an FTA and an alignment on standards between the UK and the EU, which is by far the largest overseas market for British produce. If there is No Trade Deal, some sectors might benefit but such gains are highly uncertain, and likely to be eroded by future trade deals and divergences in standards between the UK and the EU as well as within the UK internal market. Given the negative impacts in sheep and barley, which are of much importance in Scotland, the viability of many Scottish farm businesses, and several rural regions, will be jeopardised under a No Deal.

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1. INTRODUCTION

1.1 BACKGROUND

With the UK having left the EU and the end of the Transition Period on 31st December 2020, there will be significant impacts for all aspects of Scottish society, including agriculture. The Scottish farming sector faces major challenges, as the trading arrangements which have provided the framework in which the current market has developed over several decades, are set to change significantly. The UK has recently published its Global Tariffs and Border Operating Model which will provide the default arrangements with third countries/trading blocs with which the UK does not have a free trade deal in place after 1 January 2021. This will include the EU in a No Trade Deal Brexit scenario. Therefore, it is an appropriate time to assess the implications of Brexit across a range of scenarios. Accordingly, RESAS has commissioned this study to quantify the post-Brexit impact of alternative trade scenarios on the agricultural sector in Scotland and the UK generally.

1.2 PROJECT AIM AND OBJECTIVES

The project aim is to quantify the impact of Brexit on selected Scottish agricultural sectors under two scenarios vis-à-vis the baseline of the UK continuing as an EU Member State:

1. A free trade agreement between the UK and the EU (**FTA**).
2. No Trade Deal with the EU (**No Deal**).

To achieve this overall aim, the following objectives were also set:

1. Conduct a literature review of previous studies assessing Brexit impact on Scottish and UK agriculture.
2. Quantify the economic output, trade and labour utilisation of each agricultural sector during 2017 to 2019.
3. Quantify the impact of Brexit on each sector with respect to Tariffs, Non-Tariff Measures (NTMs), Tariff Rate Quotas (TRQs) and overall trade impact at the UK-EU level. These impacts would be assessed on the basis of domestic output, price and supply effects, impacts on imports and exports.
4. Analyse the impact of other economic shocks (Covid-19) under each scenario.
5. Assess the implications for the Scottish agricultural industry at both a sectoral and farm-level.

The modelling assessment covers both the short-run (6-12 months) and longer term impacts. It also considers the consequences for the Scottish Agriculture sector of the imposition of checks and border control infrastructure on trade flows between Northern Ireland and GB.

1.3 SCENARIOS

The impact of Brexit is examined under two main scenarios, vis-à-vis the Baseline (**Base**) of the UK continuing as if it were an EU Member State. These scenarios are explained further below. Also, in some Chapters (e.g. Horticulture (Ch. 8), additional sub-scenarios are assessed where there is a particularly sensitive issue (e.g. labour). Whilst the labour issue is independent of the trade scenarios, differing labour-related outcomes have been included below to illustrate a range of possibilities.

1. **FTA Deal (FTA)**: the UK (GB) is outside the Customs Union and Single Market, but with a Free Trade Agreement that includes agriculture, consisting of a zero-tariff, zero-quota free-trade arrangement. Linked with this scenario, the following assumptions are also noted;

- **Policy:** support remains the same based on the stated intention of the Scottish Government to broadly maintain existing CAP schemes, subject to simplifications and improvements, until 2024 to deliver on the Stability and Simplicity consultation.
 - **Labour:** Seasonal non-UK labour: possible under an expanded SAWS-type scheme which covers the UK's labour needs. Permanent non-UK labour: restricted to 50% of current levels. However, non-UK workers who are already resident in the UK and potentially able to qualify for "settled status" will not be affected.
 - **NI Protocol:** regulatory checks assumed to take place on trade from GB to Northern Ireland, but the NI Trader Support Service (TSS) will provide support on some of these. Minimal changes anticipated for NI to GB trade, based on the UK Government's "unfettered access" commitment.
 - **Trade facilitation costs:** are based on the non-tariff measure (NTM) cost estimates for each sector set out in Chapters 5 to 8 of this study. These include Sanitary and Phytosanitary (SPS) regulations, customs controls, the impact of time delays on product value, haulage costs and also considers various fees charged by Port Health Authorities. Overall, between 25-30 cost categories have been assessed (see Figure 2-2 below).
 - **Trade with non-EU:** to continue on the same terms at present, whether that is by WTO Most-Favoured Nation (MFN) terms with some countries or via an FTA (including rollover agreements previously under the auspices of the EU) with those countries that have such agreements in place with the UK. The legacy EU28 Tariff Rate Quotas (TRQs) are apportioned between the UK and the EU27 as set out in Chapters 5 to 8, based on a December 2018 agreement between the UK and the EU.
2. **No Deal:** the UK will apply its recently announced import tariffs (i.e. its proposed Global Tariff (UKGT) schedule) on all imported agricultural produce from the EU27 and third countries which do not enjoy enhanced access via free trade agreements or TRQs. For beef, as Chapter 7 details, an additional 196Kt TRQ for beef is assumed, and a sensitivity analysis has also been undertaken to look at the impacts if a lower (98Kt) TRQ was introduced instead. The assumptions concerning policy, trade facilitation and trade with non-EU outlined in the FTA scenario also apply. Additional points include:
- **Labour:** Seasonal non-UK labour: possible under an expanded SAWS-type scheme, but only to 50% of existing levels of migrants employed in seasonal roles. Permanent non-UK labour: restricted to 50% of current levels.
 - **NI Protocol:** regulatory checks to take place on trade from GB to Northern Ireland, but the NI Trader Support Service (TSS) will provide support on these. Tariffs would also be payable upon entry into Northern Ireland from GB, as goods would be considered "at risk" of entering the EU Single Market. However, these could be claimed back for agri-food products which are consumed in Northern Ireland. Minimal changes anticipated for NI to GB trade, based on the UK Government's "unfettered access" commitment.

1.4 SCOPE

1.4.1 Sectors

As requested by the Scottish Government, this study focused on the following agricultural commodities;

- Beef
- Sheep
- Dairy

- Horticulture – focusing specifically on potatoes (seed and ware), strawberries and brassicas (cauliflower and broccoli)
- Wheat
- Barley

In some sections of this report (e.g. non-tariff measures), further detail will be provided on products that sit within these sectors (e.g. chilled boneless beef, chilled beef carcasses etc.) to give a picture for the sector as a whole.

1.4.2 Geographic Definitions

Throughout this report, there are numerous geographical terms which are sometimes used interchangeably. It is, therefore, important to define these terms at the outset:

- **United Kingdom (UK):** includes England, Scotland, Wales and Northern Ireland (NI).
- **Great Britain (GB):** consists of England, Scotland and Wales.
- **Ireland:** refers to the Republic of Ireland and is part of the EU27.
- **Island of Ireland:** includes both Northern Ireland and the Republic of Ireland.
- **The European Union (EU):** consists of 27 EU Member States (excluding UK); often cited as EU27.
- **EU28:** includes the EU27 and the UK when it was an EU Member State.
- **EU26:** EU Member States excluding the Irish Republic as well as the UK. Sometimes referred to as "Continental EU".
- **Non-EU:** all countries outside of the EU27 and the UK; periodically referred to as Rest of World (ROW) or "third countries".

1.5 REPORT STRUCTURE

This is a Summary Report with the key Chapters and accompanying Annexes set-out below.

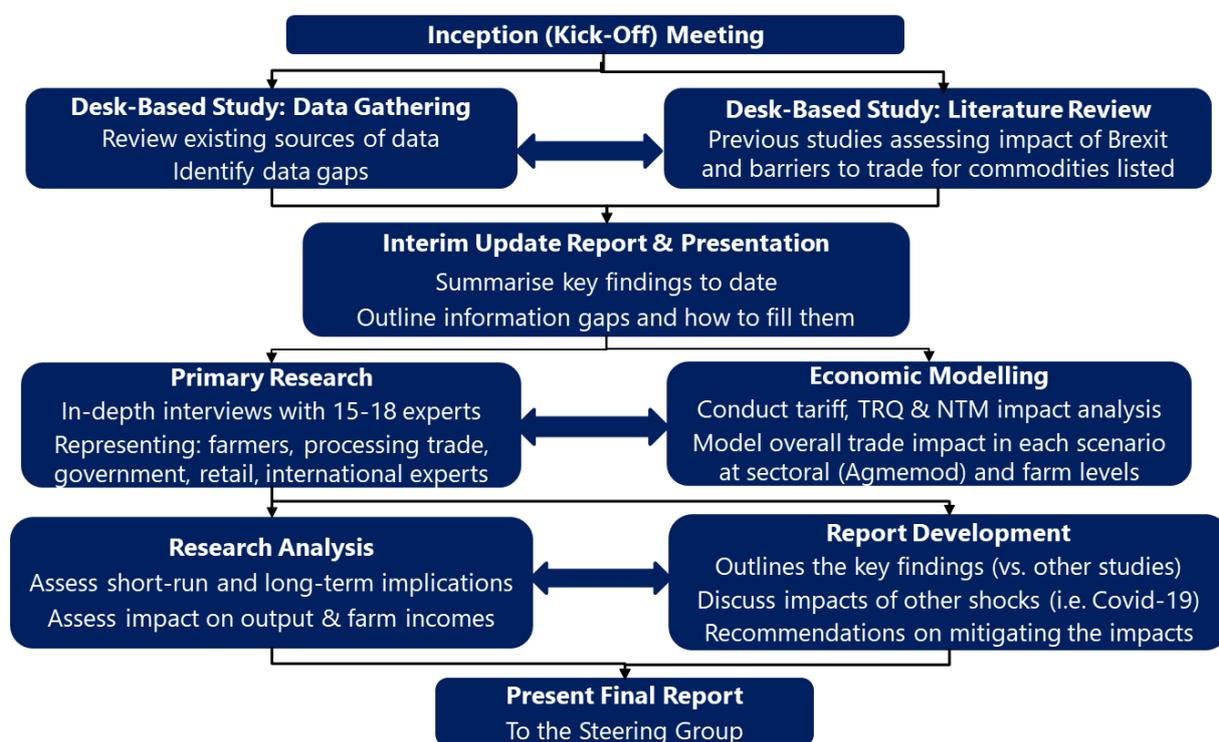
- **Methodology (Chapter 2):** briefly summarises the research techniques, modelling tools, data and information sources used to fulfil the study's objectives. Further detail is provided in Annex I.
- **Literature review (Chapter 3):** gives a brief summary of the findings from previous studies examining the impact of Brexit on the UK's agri-food sector. It also examines key issues such as tariffs, tariff rate quotas (TRQs), non-tariff measures (NTMs) and labour. These issues are developed further in subsequent chapters. Annex II contains the detailed Literature Review undertaken for this study.
- **Output and Trade Overview (Chapter 4):** summarises output and trade by product category, based primarily on official statistics from Defra, the Scottish Government and HMRC with the focus on UK to/from EU27 trade as well as UK trade with non-EU countries.
- **Brexit Impacts by Sector (Chapters 5-8):** here, the impacts of Brexit in terms of tariffs, TRQs and NTMs as well as the projected impacts on output and trade using Agmemod³ and the farm-level implications for Scotland are provided for Cereals (wheat and barley), Dairying, Grazing Livestock (Beef & Sheep) and Horticulture. This is supplemented by additional information in Annexes III (output and trade) and IV (Agmemod results and sensitivity analyses).
- **Key Conclusions (Chapter 9):** highlights key points for consideration by policy-makers and industry participants in Scotland based on the research undertaken during this study.

2. PROJECT METHODOLOGY

2.1 GENERAL

Figure 2-1 shows the key methodological steps which consist of a combination of desk-based and primary research followed by economic modelling using a combination of the Agmemod partial-equilibrium model, representing the agricultural sector of the UK and the EU-27 at Member State level, as well as additional MS-Excel based analysis. The results are then analysed in terms of the implications for UK-EU trade and at the farm-level for Scottish agriculture. Section 2.2 outlines each methodological step with more detail in Annex I.

Figure 2-1 – Summary of Proposed Methodological Steps



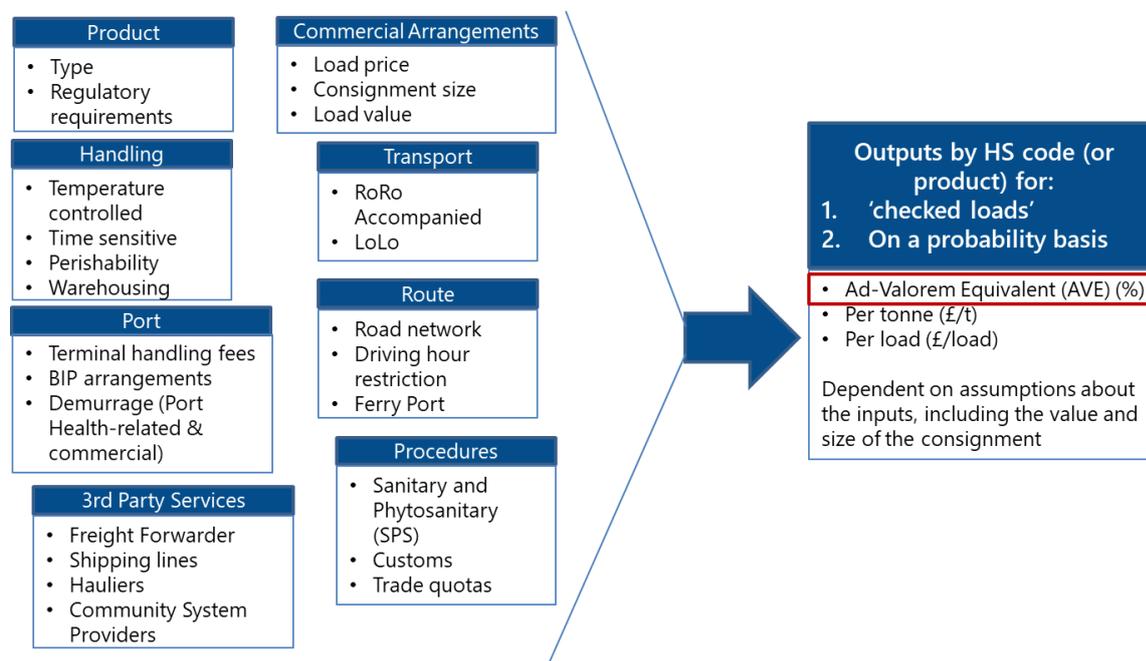
Sources: The Andersons Centre

2.2 METHODOLOGICAL STEPS

- 1 **Inception Meeting:** Andersons and the Project Steering Group clarified, at the outset, the project’s priorities, timelines, datasets and other resources which could help the study.
- 2 **Desk-Based Study:** this stage consisted of two strands;
 - a. **Data Gathering:** upon project commencement, numerous data sources were identified. Some were under the auspices of RESAS and the Scottish Government. Numerous other data sources were also used to meet the project’s objectives. These sources included organisations such as the UK Government (Defra, Department for International Trade), HMRC, SRUC and SAC Consulting, Levy Boards, the EU Commission, EUROSTAT, WTO, trade associations, the National Farmers’ Union Scotland (NFUS), OECD, UN FAO and others. Further data sources are associated with the Agmemod framework (see Step 5). Additional data sources managed by Andersons were also made available, such as;
 - o **Andersons’ NTMs Model:** uses 25-30 cost sub-categories to assess NTMs’ costs NTMs on UK-EU trade as well as third country trade entering the UK. It assesses NTMs

costs on both a “checked load” (subject to the full range of regulatory checks) and on a probabilistic basis (i.e. averaged over 100 loads to account for checking rates etc.).

Figure 2-2: Structure of The Andersons Centre’s NTMs Model



Source: The Andersons Centre

Note: NTMs costs in this study are primarily expressed in AVE terms.

- **Andersons’ Model Farms:** in use since the early 1990’s, these Scottish Model Farms have been used in addition to the FADN farm incomes data to project the implications of the Agmemod modelling results for Scottish farming incomes.
 - **ABC Books:** 90th edition data was used to assess the farm-level impacts of Brexit in the horticultural sector (Chapter 8).
- b. **Literature Review:** identified and examined what overlapping or supporting work was undertaken in recent years, thus preventing a repetition of effort and resources. It primarily focused on the Scottish or wider UK agricultural industry but also considered wider economic impacts. Andersons combined existing knowledge from previous studies with updated analyses to produce a thorough review of the best available knowledge on this topic. Chapter 3 summarises the key findings. Annex II contains the full Literature Review. It serves as a useful backdrop and grounding for most of the chapters in the report.

The inputs from both the Literature Review and Data Gathering stages were used to establish the baseline situation for UK and Scottish agriculture in terms of output and sales by geographic market. By using 2017-19 as the baseline, it precludes the impact of Covid-19 (Covid Crisis) thereby removing any odd effects arising from the pandemic (e.g. loss of food services exports to EU markets). That said, some additional commentary has been provided on the impact of the Covid Crisis within each sector and chiefly draws upon the study’s primary research.

- 3 Interim Report Update:** was submitted upon completion of the Literature Review, summarising the key findings to date and provided initial insights from the Primary Research.
- 4 Primary Research:** collected evidence from industry experts to ascertain the specific impacts of Brexit on each Scottish agricultural sector. This helped to provide a greater Scottish context to the economic modelling. In total, 17 in-depth discussions (circa 30-45 minutes’ duration)

took place with a variety of stakeholders as summarised in Table 2-1. Additional shorter discussions on specific points were also held with several industry participants, partly based on the recommendations of initial interviewees. Some participants also provided supplementary information which helped to further expand the data gathered over the course of the study.

Table 2-1 – Summary of Primary Research Interviews Undertaken

Key Assumptions	No. of Interviews	Stakeholder Type
Beef and Sheep	5	Includes 2 processors & 3 trade/farming associations
Dairy	3	1 processor, 1 farming organisation, 1 trade association
Cereals	4	1 trade association, 1 inputs supplier, 1 trader and 1 maltster
Horticulture	4	3 growers/suppliers and 1 trade association
Other / General	1	Trade association specialising in logistics
Total	17	

Source: Andersons

- 5 Economic Modelling:** combined partial equilibrium modelling (using Agmemod) and MS Excel-based analyses to quantify the impact of Brexit at a UK sectoral level (i.e. effects on domestic output, impacts on supply, demand, prices and trade). Subsequently, additional Excel analysis was run on a Scottish farm-level to ascertain the potential Brexit impacts.

Agmemod is a partial equilibrium modelling system focusing on the agricultural, food (and fisheries) sectors in the EU and neighbouring countries (e.g. the UK). For each country, it covers key agricultural commodities in detail. Although the scope of the commodity coverage varies between countries reflecting agricultural output in each nation, it captures in detail, the key interactions in each agricultural sector including overseas trade.

It is used each year by the European Commission to generate its Market Outlook series. It has also been used to assess potential changes in agricultural policy. On several occasions, it has been deployed to assess the impacts of Brexit on UK-EU trade and resultant impact on UK agricultural output. As it has detailed coverage of most of the commodities being focused on in this study (i.e. wheat, barley, dairying, beef, sheep and potatoes) and benefits from a collaborative network of research organisations in more than 30 countries, it was selected as the basis of the economic analysis presented in Chapters 5 to 8. See Annex I for more detail.

Additional Excel-based analysis was used with agricultural costings data to quantify the potential Brexit impacts for cauliflower, broccoli and strawberries (see Chapter 8).

To undertake the Agmemod economic modelling simulation, Andersons was supported by Wageningen University and Research (WUR). It has extensive experience in using Agmemod over 20 years and has completed several Brexit-related studies concerning both the UK⁴ and the Netherlands⁵. Therefore, the economic modelling has built on the collective experience that both Andersons and WUR have obtained during past studies. Several of these have involved both specialist econometric modelling and Excel-based analysis. The Agmemod sectoral level modelling consisted of the following elements:

- a. **Baseline data:** used a combination of historical data on UK and EU output and trade contained within Agmemod and data obtained from the Data Gathering stage. The latter consisted of obtaining both UK level data (e.g. Defra AUK data and HMRC) as well as Scottish specific data (e.g. ERSA and Scottish TIFF⁶) in addition to EU data obtained from

the EU Commission's agri-food data portal⁷ and EUROSTAT. It is against this baseline (**Base**) that the effects of the trade-related changes were assessed under each scenario.

- b. Tariff impacts:** were assessed with respect to UK exports to the EU and the imposition of the UK's Global Tariffs (UKGT) on imports from the EU27 and non-EU countries. The EU Common External Tariff (CET) schedule was used to assess the impact of tariffs on UK exports to the EU. Where several tariffs would be potentially applicable to a sector (e.g. beef) and vary significantly by commodity code, a weighted average of the top-5 traded products was also considered. This was based on UK HMRC trade data. These tariff impacts were then converted into an Ad-Valorem Equivalent (AVE) price impact which was considered in the Agmemod modelling.
- c. Tariff Rate Quota (TRQ) impacts:** for each commodity, the projected impact of the reallocation of existing EU28 TRQs based on historic import trade between third countries with the UK and the EU27 was assessed. Whilst it is acknowledged that some WTO members rejected this proposed division, no alternative has been put forward. Therefore, the proposed UK-EU27 allocations have been assumed. This involved an examination of TRQ volumes which would be potentially available for UK (and Scottish) exporters post-Brexit as some TRQs are open to everyone (i.e. not allocated to specific countries).

Consideration was also given to the impact of potential new TRQs that the UK could potentially make available to importers. Although it was thought that the UK Government would have announced this by September 2020, details are still awaited. Therefore, in a No Deal scenario, it was assumed that the UK would introduce TRQs for beef only based on average net annual imports during the Baseline period (196Kt). This 'new' TRQ would be made available to imports from all countries (i.e. on an Erga Omnes basis), provided they could meet the UK's regulatory standards. A sensitivity analysis was also undertaken which assumed that the TRQ offered by the UK would be half the net import volume (i.e. 98Kt). This would again be made available on an Erga Omnes basis.

- d. Non-Tariff Measure (NTM) costs:** were calculated for each commodity using Andersons' NTMs model. For some sectors, notably beef, lamb and dairying, several products were assessed. In this report, NTM costs have been quantified in terms of ad-valorem percentages. However, Andersons' NTMs model also produces pounds (£) per tonne and cost per load NTM estimates. See Annex III.

It is noted that the Government has recently announced that some regulatory procedures will not become applicable to UK imports from the EU until April or July 2021. As this study is focusing on the impacts from 6-12 months onwards, the NTM cost calculations were based on the full imposition of regulatory controls. For any trade moving from Scotland to Northern Ireland (NI), it is envisaged that EU regulatory controls would be applied as products enter NI, but that the recently announced Trader Support Service⁸, should help to mitigate a significant proportion of these costs. NTM costs in the opposite direction (NI to Scotland) were also considered, but these are likely to be subject to fewer restrictions based on the UK Government's "unfettered access" commitment.

- e. Trade Impact Modelling:** drawing upon the estimates on tariffs, TRQs and NTMs, the Agmemod model was deployed to estimate the potential impact of these trade barriers on post-Brexit trade under an FTA and No Deal scenario. The overall modelling approach consisted of the following key steps with further detail on the methodology and results provided in Annexes I and IV respectively. The Agmemod modelling focused solely on

the trade-related aspects of Brexit and kept agricultural policy support payments constant as this is expected to be the situation in Scotland until 2024.

- f. Quantify impact on Scottish farm-level performance:** was compiled based on the trade impact modelling analysis. This was done using both the Scottish Farm Business Income dataset and Andersons' Model Farms. For horticulture (Chapter 8), insights from the [Scottish Farm Management Handbook](#) and the [ABC Book](#) were used to compile a Brexit impact analysis for cauliflower, broccoli and strawberries. This is because Agmemod only provides projections for potatoes at a UK-level.
- 6 Research Analysis:** was done in conjunction with the Report Development stage, based on the economic modelling results and farm-level assessments. This was accompanied by a commentary on the implications for Scottish agriculture. Here, insights from the Primary Research were also used to ascertain the impact on Scottish agri-food trade, particularly with the EU27. Consideration was also given to the short-term impact (6-12 months) and the longer-term impacts (after 1 year or more) from application of the policy measures.
- 7 Report Development & Finalisation:** the draft summary report, with accompanying Annexes, were compiled to set-out the study's findings. The draft report was peer-reviewed internally by Andersons colleagues. Feedback was incorporated into the report which was submitted to the Project Steering Group. Thereafter, a presentation and feedback session was completed and agreed refinements were incorporated into the final report.

3. LITERATURE REVIEW SUMMARY

3.1 INTRODUCTION

This Chapter summarises the key findings of a review of the relevant literature on the potential impact of Brexit on Scottish agriculture. The full Literature Review is provided in Annex II. The review is broadly split into three parts, the first looks at previous studies into the overall (macro) effect of Brexit at the UK level, focusing primarily on trade with the EU. The second part examines Scottish-specific studies on its farming sector. *This past work has been used for two purposes – as a ‘check’ on methodology and results to inform the design of this report. Also, to provide an initial data source for variables to incorporate into the subsequent economic modelling.* The third part looks in more detail at the key variables that are used in the later modelling – tariffs, non-tariff barriers, TRQs, support systems etc. These sections pick-up elements from the earlier ‘macro’ studies, but also bring in more detailed analysis from elsewhere.

3.2 RESULTS OF PREVIOUS STUDIES AT UK-EU LEVEL

The Literature Review conducted for this study involved examining over 80 studies looking at the impact of Brexit, particularly at a UK-EU level. The key findings are summarised briefly as follows;

- If a UK-EU FTA is agreed, then the effect on prices and consequently farm incomes is relatively small. There are effects from the additional costs of doing trade with the EU, but as the UK is generally a net importer from the EU, this increases prices for many commodities. In this scenario, with trade effects relatively minimal. Significant drops in farm income are seen if farm support is reduced or withdrawn.
- In the absence of a UK/EU FTA then two alternative scenarios have generally been modelled. One is trade with the EU on WTO terms, but mirroring current EU tariffs with new UK tariff rates. The other is unilaterally opening the UK market to tariff-free imports for the EU and RoW.
- In terms of WTO trade, the effect on a particular commodity largely depends on the UK trade balance. Where exports are required (e.g. lamb and barley) then prices generally fall as access to key markets in the EU are restricted by new tariffs. Where the UK is a net importer (e.g. wheat, dairy products) prices rise as tariffs make EU imports more expensive.
- A unilateral liberalisation of trade causes UK prices to fall in all commodities as UK producers are forced to compete with cheaper prices from non-EU regions which adversely affects farm incomes.
- In either of the ‘No Deal’ scenarios the negative effect on farm incomes is amplified by any changes to domestic farm support arrangements.
- In studies that have incorporated labour effects, this is generally seen to be detrimental to farm incomes as limits on free movement of labour increase UK costs.

The Brexit process continues to evolve and changes in the political and economic landscape have occurred since previous reports were published. Most notably, the UK Global Tariffs and Border Operating Models have been published which will have a significant impact on imports especially. These will affect the assumptions used in the economic modelling and thus the outcomes for each sector.

3.3 SCOTTISH STUDIES

In addition to reports focusing on the UK-EU level, several number of studies were also reviewed looking at the impact of Brexit on Scottish agriculture specifically. Annex II contains more information. From an agricultural perspective, two main reports have focused on Scotland.

AHDB

Firstly, the AHDB produced a report in November 2017⁹ looked at the specific effects on Scotland at a farm-level. This built on the assumptions set out in its earlier UK-wide analysis (see Annex II) and so looked at the effects of trade, domestic support, labour availability and regulation.

below summarises the key assumptions used in the modelling and the headline results. It recognised the specific challenges posed by Brexit to Scottish agriculture including;

- The high proportion of Less Favoured Area (LFA) land in Scotland (85% of agricultural land compared to 17% in England).
- Distance to key markets and the lack of local processing facilities in some cases.
- Differences in the relative sizes of sectors, with beef and potatoes being especially important in output terms in Scotland.

It was also noted that Scottish agriculture has advantages in terms of its 'brand' – notably Scotch Whisky, Scotch Beef and its seed potato industry.

Table 3-1: AHDB: Assumptions and Results of Brexit Implication for Scotland

Key Assumptions	Scenario 1: Evolution	Scenario 2: Unilateral Liberalisation	Scenario 3: Fortress UK
Support	Direct Payments (DPs) and Agri-Environment Payments remain at current levels	DPs removed, Agri-environment payments increased to 50% of total current support levels.	DPs removed, Agri-environment payments set at 25% of total current support levels.
Labour	As at present.	50% increase in regular labour cost. No change in casual.	50% increase in both regular and casual labour cost.
Trade	Comprehensive UK/EU FTA giving tariff-free trade. 5% increase in cost of EU imports due to trade friction. 8% increase in RoW import costs due to friction.	No UK/EU deal. 8% increase in cost of EU and RoW imports due to trade friction but no import tariffs applied.	No UK/EU deal. 8% increase in cost of EU and RoW imports plus tariff costs. Exceptions for some TRQs.
Regulation	As at present.	Regulatory burden to fall over time. 5% cost reduction in some inputs.	All EU regulations adopted. No change in costs.
Results - % change in Farm Business Income From Baseline			
Specialist Sheep	-10%	-8%	-210%
Specialist Cattle	+14%	-89%	-86%
Dairy	+52%	-88%	+37%
Cereals	-9%	-81%	-103%
General Cropping	+2%	-66%	-60%
Pigs	+49%	+25%	+346%
Horticulture	+45%	-12%	-8%

Source: AHDB

The study applied the variables to some Scottish-specific farm types and calculated the change in Farm Business Income (FBI) compared to the baseline (current) situation. The 'Evolution' scenario might be considered to approximate an FTA deal. Unilateral Liberalisation as an option now seems unlikely with the publication of the UK's proposed Global Tariff regime. However, the UK/Scotland could approach this situation over time, depending on the future FTAs it strikes with other countries or if it introduces significant new TRQ volumes. The Fortress UK option most closely models the No-Trade-Deal outcome, but the Support assumptions are unlikely to occur in the short-to-medium-term. The projected labour cost increases are also substantial, particularly when viewed in the context of Covid-19 (see Section 3.4). Therefore, it can be seen that none of the scenarios quite model the current Brexit situation.

SRUC

A further report from SRUC for the Scottish Government (Shrestha *et. al.* Jan 2018¹⁰) used the FAPRI-UK model to assess the impacts on Scottish agriculture. This study, summarised in Table 3-2, used three trade scenarios equivalent to those seen in the AHDB study. Support changes were limited to keeping present subsidy levels (denoted by a '+' in the results) or a complete removal of direct aid ('-'). No account was taken of labour or regulatory changes.

The price changes produced by the FARPI model are mapped onto typical Scottish farm businesses based on the Scottish Farm Business Survey (2014/15 reporting year). Results are presented for four major farm types which cover the majority of Scottish agriculture.

In both the AHDB and SRUC work, a Free Trade deal between the UK and EU leads to the least change from the status quo. However, it can be seen that, particularly under the AHDB 'Evolution' scenario, there are still big changes in Farm Incomes (profit) compared to current levels. Any 'No Deal' outcome, either with or without tariff protection around the UK market, tends to exacerbate the level of change. These points are picked up in more detail in the remainder of this study.

Table 3-2: SRUC: Assumptions and Results of ‘Assessing the Impacts of Alternative Post-Brexit Trade and Agricultural Support Policies on Scottish Farming Systems’

Key Assumptions	Scenario 1: Free Trade (FT)	Scenario 2: WTO Default (WTO)	Scenario 3: Unilateral Trade Liberalisation (LT)			
Trade	UK and EU retain tariff and quota free access to each other’s markets. UK maintains tariffs equivalent to CET on RoW imports. 5% trade facilitation costs	Tariffs imposed on UK-EU trade (at CET levels). UK maintains tariffs equivalent to CET on RoW imports. 8% trade facilitation costs	Zero tariffs on UK imports from all sources. Standard CET on UK exports to EU. 8% trade facilitation costs.			
Support	Two scenarios – current support maintained in full (+) or all direct support removed (-).					
Price Changes Compared to Baseline (2025) - FAPRI						
Beef	3%	17%	-45%			
Sheep	-1%	-30%	-29%			
Milk	1%	30%	-10%			
Wheat	-1%	-4%	-5%			
Barley	-1%	-5%	-7%			
Results - % change in Farm Business Income From Baseline						
Support:	+	-	+	-	+	-
LFA Beef	0%	-68%	-14%	-56%	-66%	-126%
Dairy	3%	-18%	59%	42%	-25%	-44%
LFA Cattle & Sheep	2%	-148%	16%	-141%	-69%	-199%
Crops	1%	-56%	-3%	-58%	-4%	-59%

Source: SRUC

3.4 OTHER VARIABLES

- Tariffs:** Most agri-food tariffs under the UK Global Tariff (UKGT) have been maintained at the same levels of the CET, but converted from Euro into Sterling, mostly using the currency conversion rate €1 = £0.83. There are some variations due to rounding and simplifications. *Effectively, the protection around the UK market will be kept at the same level as it was round the EU Single Market.*
- Tariff Rate Quotas (TRQs):** There are three issues concerning TRQs. The first is how to apportion existing EU28 TRQs between the UK and the EU27. The other is whether the UK issues any additional TRQs when it runs an independent trade policy. The apportioning of the old EU28 TRQs between the UK and the EU27 was agreed between both parties in late 2018¹¹; however, third countries such as the US, China and New Zealand rejected these proposals at the WTO¹². Table 3-3 provides a top-level overview of how the EU28 TRQs have been apportioned between the UK and the EU27 with further detail available in Chapters 5 to 8 as well as in Annex III.

Table 3-3: Summary Overview of the Division of EU28 TRQs between the UK and the EU27

Commodity	EU28 (t)	EU27 (t)	EU27 Share (%)	UK (t)	UK Share (%)
Wheat (All types)	3,412,030	3,288,648	96.4%	123,382	3.6%
Barley (All types)	357,995	327,601	91.5%	30,394	8.5%
Other barley-derived preparations	120,000	120,000	100%	0	0.0%
Selected Cereals	3,890,025	3,736,249	96.0%	153,776	4.0%
Skimmed-milk powder	68,537	68,537	100%	0	0%
Butter	86,053	58,537	68.0%	27,516	32.0%
Cheeses	82,952	73,919	89.1%	9,033	10.9%
Beef & Beef Offal	186,904	124,373	74.9%	62,531	25.1%
Sheepmeat*	281,325	143,599	51.0%	137,726	49.0%
Potatoes (fresh)	4,295	4,292	99.9%	3	0.1%

Source: European Commission

* Includes goat meat.

- It remains to be seen how this issue can be resolved, but in the absence of a wider agreement, the proposed UK-EU27 apportionments will be used in the modelling for this study. These are shown in summary format in Table 3-3 above and in more detail in Chapters 5 to 8 for each sector. An announcement on new TRQs that the UK might introduce (second issue) was expected in September, but is now anticipated later in the year. This could include a 'new' Beef TRQ which could have a major impact on the competitiveness of Scottish agriculture (particularly if it is similar to the 230Kt beef TRQ that the UK suggested in March 2019). The third TRQ issue which arose during the primary research are TRQs agreed under FTAs with other countries. For instance, Canada is eligible for TRQ access to the EU for beef under CETA. How these TRQs are dealt with under the continuity agreements that the UK is seeking to complete with third countries that the EU has an FTA with, will also have some (largely limited) impact on Scottish agriculture.
- **Northern Irish Protocol¹³:** A major concern is the possibility of an increase in tariff avoidance through illegal smuggling across the border between the Irish Republic and Northern Ireland dependent upon the Brexit Deal or No Deal outcome. This includes instances of avoiding import tariffs if agricultural products were moved through the Single Market (specifically Ireland), into Northern Ireland and then into Great Britain. In such cases, the impact of NTMs would also be significantly reduced compared to a direct import into Great Britain. This concern is emerged during the primary research as potentially having a notable impact in beef, and dairy where existing UK imports from the EU are dominated by that from the Republic of Ireland.
- **Non-Tariff Measures (NTMs):** These are Government-imposed requirements, unrelated to tariffs, but which are faced by trading businesses. When looking at NTMs it is important to recognise the differences between different products. Whilst using AVE percentages and applying across a whole category of trade (e.g. beef) is unlikely to capture all the nuances (e.g. chilled products more affected by value deterioration than frozen etc.), they have been used in the Agmemod model. However, for some commodities (e.g. beef) consideration has also been given to the top-5 products traded, so that greater nuance is captured. For this study, the NTM estimates are based on Andersons' NTMs model which has been developed as a result of several studies over recent years.
- **Rules of Origin (RoO):** These determine in which country a product and its components have to be produced to benefit from preferential tariffs agreed under an FTA. It is argued that even if the EU and the UK reach a trade agreement, many UK exports to the EU would not be eligible anymore

to preferential access (if value chains remain unchanged) because not enough value added is being produced in the UK. This would especially be the case where in the case of agri-food where UK and EU agri-food supply chains are closely integrated, as compliance with European RoO requirements potentially could increase administrative costs for exports to the EU¹⁴. In summary, as long as over 90% of raw materials (based on bill of materials) meet origin requirements as deriving from the UK or EU then they would be permitted tariff-free access under an FTA. If the 'non-indigenous' component is over 10%, then restrictions apply in an FTA scenario.

- **Labour:** for red meat, a 2017 survey (by QMS) shows 52% of the unskilled workforce, 44% of the skilled workforce and 16% of supervisory and management staff to be non-UK nationals. In total, among those businesses responding to the survey just in excess of 1,500 employees are non-UK nationals or some 43% of the total workforce. In addition, Food Standards Scotland reported that around 98% of their official veterinarians were non-UK nationals.

A 2015 study¹⁵ found that a 1% increase in the migrant/non-migrant ratio in the semi/unskilled service occupation group led to a reduction of wages for those in that group of around 0.2%, larger than can be accounted for purely by compositional changes. As any negative effect of migration is skewed towards those at the lower end of the wage distribution, the analysis looked at the effect on different percentiles of earnings. The 6.7% increase in the EU-born working age population ratio between 1993 and 2017 implied a total effect on UK-born nominal wages of EU immigration of a 5.2% reduction to the 5th percentile, and a 4.9% reduction at the 10th percentile. Although not all agri-food jobs are low wage, it is arguable that, in the absence of free-movement, wage costs might have been around 5% higher. These analyses are conducted on permanent, full-time employment. Of course, much employment in agriculture, and especially horticulture is seasonal and casual.

Another recent study carried out by Anderson Midlands¹⁶ for the NFU focused on the additional costs in the fruit and vegetable sector due to Covid-19 restrictions. Although not directly a Brexit issue, Covid has limited the supply of labour from the EU in the same way that ending free movement of labour will. It found that farm employment costs increased by between 6% and 15% in the UK fruit and vegetable sector. Five key areas contributed to this rise; worker availability & recruitment, training, accommodation, transport & logistics and operations.

- **Regulation:** The cost of regulation is partly captured in the NTMs analysis. However, regulation also impacts at farm level. This is both directly, in terms of complying with farm standards (e.g. NVZs, animal welfare) and indirectly through access to technology and inputs. In this study, it is assumed that there will be no major change in the regulatory burden (and cost) on Scottish agriculture. Both the Agriculture and Environmental Bills in the Scottish Parliament are designed to largely continue the status quo and to keep Scottish legislation in conformity with EU laws (as they evolve). This is contrast to Westminster where there is much talk of 'doing regulation better'. However, across the UK there seems little chance of a 'bonfire of red-tape' in the medium term.

The second (indirect) impact of regulation affects the way agricultural technology is regulated. This influences the inputs UK farmers have access to and their relative competitiveness against international competition. Two often-cited examples are the regulation of genetic modification technologies and plant protection products (pesticides). As with on-farm regulation, this study assumes that no substantive changes, large enough to have an economic impact. For example, the Scottish Government has a long-standing policy¹⁷ of opposing the cultivation of GM crops in the open environment.

4. OUTPUT AND TRADE OVERVIEW

This Chapter provides an overview of agricultural output for the UK and Scotland as well as UK agri-food trade with EU and non-EU countries and estimates of exports from Scottish agriculture. This information is used to illustrate the importance of trade at both a general (UK-EU) level but also the importance of exports and imports to production and consumption across the UK as well as in Scotland specifically. These insights form a prelude to assessing the impact of Brexit under each scenario for the selected agricultural sectors (Chapters 5 to 8). Additional information is contained in Annex III.

4.1 SCOTTISH AND UK AGRICULTURAL OUTPUT

Table 4-1 summarises Scottish and UK agricultural output in both value (£m) and volume (Kt) terms. Estimates of Scotland's share of UK output are also provided. The value of output of the commodities under examination in this study is valued at just under £2.1 billion per annum. This represents 81% of the total value of output (excluding subsidies) for Scottish agriculture. In comparison with the UK generally, Scotland's share of the value of output for selected categories stands at just over 14%.

Scotland is an important contributor to UK agricultural output in monetary terms and its contribution is even more pronounced in beef (~20% share), sheep (~17%), potatoes (~30%) and fruit (~17%). For beef, Scotland's has a higher monetary share of UK output (nearly 20%) vis-à-vis its share of UK tonnage (just over 18%). This illustrates that Scotch beef attracts a premium as do Scottish strawberries.

For cereals, which in Table 4-1 only includes wheat, barley and oats, Scotland has a consistent (12.5%) share of UK output in both value and volume terms. However, it has a much larger share of the UK barley crop (>25% share of both value and volume). In tonnage terms, Table 4-1 also shows that more than a third of the UK spring barley crop is produced in Scotland, whilst Scotland's share of UK winter barley production is estimated at just over 11%.

Malting barley is also highly important in Scotland. It is difficult to get an exact estimate of how much Scottish malting barley is produced because one of the leading maltsters in the UK is based in Berwick just over the border in England. It procures malting barley from both Scottish and English growers. That said, based on SRUC estimates¹⁸ from 2017 and the primary research, approximately 90% of the malting barley used by Scottish whisky distillers is grown in Scotland. The Scotch whisky sector has achieved significant growth recently. Based on industry expert opinions obtained during this study, Scotland produces about 900Kt of malting barley annually. This implies that malting barley accounts for nearly half of overall Scottish barley production (1,826Kt).

The value of Scottish wheat is slightly lower than the UK generally. This is partly due to a higher proportion of feed wheat in Scottish wheat production (circa 49%)¹⁹, whereas across the UK feed wheat accounts for about 45% of homegrown production²⁰. Transport costs are also likely to have an influence.

There are several sectors where the value of Scottish output is lower in proportional terms than its corresponding share of tonnages. This includes sheepmeat and liquid milk, sectors where a significant proportion of Scottish output is processed in England. This creates difficulties in determining the precise proportion of Scottish grown/reared produce that ends up being exported to the EU as section 4.3 elaborates on.

The Scottish seed potatoes' sector merits comment as it accounts for 78% of UK production in value terms. Much of this production is sold across the British and Irish Isles whilst exports, particularly to non-EU markets, are also significant. This includes markets such as the Canary Islands, which although a Spanish territory, require separate phytosanitary certification as the regulatory regime is different to that of the EU. Other key markets include the likes of Egypt and Morocco.

Finally, for cauliflower and broccoli, there is limited data available in terms of output. At a UK level, Defra provides monetary estimates of output for each crop and based on primary research input obtained during this study, Scottish output for cauliflower is estimated at £6 million (12.2% of UK) and £10 million for broccoli (16.3% of UK). Due to lack of data, a combined volume estimate of 193Kt has been provided for UK cauliflower and broccoli output with Scottish production having an estimated 14.5% share.

Table 4-1: Overview of Scottish and UK Agricultural Output – Selected Categories – 2017-19

Sector / Commodity	Scottish Output (£m)	UK Output (£m)	% UK	Scottish Production (Kt)	UK Production (Kt)	% UK
Cereals^①	415	3,331	12.5%	2,873	23,048	12.5%
Wheat	121	2,207	5.5%	856	14,872	5.8%
Barley	269	999	26.9%	1,826	7,242	25.2%
Spring Barley (tonnage only)				1,483	4,202	35.3%
Winter Barley (tonnage only)				343	3,040	11.3%
Beef	575	2,899	19.8%	167	907	18.4%
Sheepmeat	213	1,240	17.2%	61	308	19.7%
Liquid Milk^②	384	4,424	8.7%	1,328	14,933	8.9%
Horticultural crops (incl. Potatoes)	512	3,008	17.0%	1,610	8,761	18.4%
Potatoes	225	762	29.6%	1,152	5,510	20.9%
Seed	76	97	78.1%	284	366	77.6%
Human consumption	146	650	22.4%	807	3,643	22.2%
Vegetables	148	762	19.4%	413	2,530	16.3%
Cauliflower ^③	6	49	12.2%	13	193	14.5%
Calabrese (broccoli) ^③	10	61	16.3%	15		
Fruit	139	806	17.2%	45	721	6.2%
Strawberries	95	357	26.6%	30	137	22.3%
Overall Total	2,098	14,903	14.1%			

Sources: Scottish Government, Defra and Andersons

① Cereals includes wheat, barley and oats only. ② Volume of liquid milk production provided in million litres' terms. ③ Estimate based on farmgate prices. Refers to fresh only.

4.2 UK-EU TRADE FLOWS

Most of the data on trade with the EU are provided at a UK level and as the economic modelling is undertaken on a UK-EU basis, it is useful to examine trade flows on this basis as well. To conduct this analysis, two main sources are used – Defra's Agriculture in the UK publication²¹ (see below) and HMRC data (see Annex III).

Table 4-2 gives a breakdown of UK output and trade (volume-based), primarily using Defra data with some additional estimates provided by Andersons based on an analysis of HMRC data and primary research input for cauliflower and broccoli.

Trade with the EU dominates across most categories. Over 92% of wheat exports are to the EU and over two-thirds of wheat imported into the UK come from the EU. Over 90% of barley exports are also to the EU27 and whilst imports of barley (94Kt) are relatively small, almost all comes from the EU27.

The UK's also imports over 94% of beef from the EU, chiefly Ireland, which accounts for around two-thirds of beef imports into Britain generally. Although beef exports to the EU are around two-and-a-

half times smaller than the corresponding exports, they still account for over 86% of total exports and often fetch very high prices.

The reliance on export markets for sheepmeat is even more pronounced with near 95% of total exports going to the EU, particularly France. During 2017 to 2019, this equates to over 31% of sheepmeat production and reveals the sector’s potential exposure in a No Deal Brexit scenario.

UK milk output is estimated at just under 15 billion litres per year. About 6% of this (974 million litres) is exported and the vast majority of this relates to milk produced in NI which is shipped to the Republic of Ireland for further processing. Some imports also occur and given the bulky and perishable nature of liquid milk, virtually all of this is trade with the EU as shown in Table 4-3 and Table 4-4.

For potatoes, as the Defra data does not segment imports and exports by type of potato (seed, maincrop, processed etc.), although it does give net trade estimates, the breakdown between EU and non-EU trade is provided for potatoes as a whole. Based on an average of the past three years, Defra data suggest that a net volume of nearly 100Kt of seed potatoes are exported annually. For early/maincrop potatoes approximately 11Kt are net exports, however, nearly 1.9Mt of potatoes for processing are imported on a net basis over the 2017-19 period.

Finally, in relation to cauliflower and broccoli, industry input during the primary research suggests that an estimated 80Kt of frozen product (50:50 split) was imported from the EU into the UK in recent years. Much of this from Spain and Poland where production costs are lower. UK production of frozen cauliflower and broccoli is small (circa 12-13Kt) and this is chiefly a function of higher production costs.

Based on subtracting exports from UK production and adding on imports into the UK, estimates of the availability of each product for UK consumption is also provided on the right hand side. This can be taken as a proxy for the UK consumption with the caveat that some of these volumes will also be used as stocks which may be consumed several months into the future.

Table 4-2: Overview of UK Agricultural Production, Trade and Usage (2017-19)

Sector	Value (£m)	UK Production (Kt)	Imports – EU (Kt)	Imports – Non-EU (Kt)	Exports – EU (Kt)	Exports – Non-EU (Kt)	Available for UK to Consume (Kt)③
Cereals①	3,331	23,048	1,388	611	1,816	170	23,062
Of which:							
Wheat	2,207	14,872	1,258	610	650	55	16,035
Barley	999	7,242	93	1	1,116	114	6,107
Other (Oats)	125	934	37	0	50	1	920
Beef	2,899	907	324	19	127	19	1,103
Sheepmeat	1,240	308	21	72	97	5	299
Liquid Milk②	4,424	14,933	144		974		14,103
Potatoes	762	5,510	1776	624	485	153	7,271
Cauliflower/ Broccoli④	110	193	116	6	7	0.2	225
Strawberries	357	137	64	12	4	0.1	208

Sources: Defra (2020), HMRC and Andersons

① Cereals includes wheat, barley and oats only. ② Volume of liquid milk production at farm-gate provided in million litres’ terms. ③ Denotes “Total New Supply” in Defra’s Agriculture in the UK report, includes both domestic usage and stocks. ④ Refers to fresh cauliflower and broccoli only, frozen excluded. Estimates derived from HMRC data and primary research input.

Table 4-3 and Table 4-4 provide estimated breakdowns of UK production by geographic market and UK consumption by geographic source respectively. It shows that for the products under examination

in this study, the majority of UK production is consumed domestically and whilst exports account for a relatively small proportion of sales, they are still significant, especially for sheepmeat but also for barley and beef. Unsurprisingly, exports to the EU dwarf non-EU exports.

Table 4-3: Estimated Breakdown of UK Production by Geographic Market

Sector	UK Production (Kt)	% Consumed in the UK	% Exported to EU	% Exported to Non-EU
Cereals ^①	23,048	91.4%	7.9%	0.7%
Of which:				
Wheat	14,872	95.3%	4.4%	0.4%
Barley	7,242	83.0%	15.4%	1.6%
Other	934	94.5%	5.3%	0.1%
Beef	907	83.8%	14.0%	2.1%
Sheepmeat	308	66.8%	31.4%	1.7%
Liquid Milk ^②	14,933	93.5%	6.5%	0.0%
Potatoes	5,510	88.4%	8.8%	2.8%
Cauliflower / Broccoli ^③	193	93.7%	6.1%	0.2%
Strawberries	137	97.2%	2.8%	0.0%

Sources: Defra (2020) and Andersons

^① Cereals includes wheat, barley and oats only. ^② Volume of liquid milk production is in million litres' terms. ^③ Refers to fresh cauliflower and broccoli only, frozen excluded. Estimates derived from primary research input.

Table 4-4: Estimated Breakdown of UK Consumption by Geographic Source

Sector	Estimated UK Consumption (Kt) ^①	% Produced Domestically	% Imported from EU	% Imported from Non-EU
Cereals ^②	23,062	91.3%	6.0%	2.7%
Wheat	16,035	88.4%	7.8%	3.8%
Barley	6,107	98.4%	1.5%	0.0%
Other	920	96.0%	4.0%	0.0%
Beef	1,103	69.0%	29.3%	1.7%
Sheepmeat	299	69.0%	6.9%	24.0%
Liquid Milk ^③	14,242	99.0%	1.0%	0.0%
Potatoes	7,271	67.0%	24.4%	8.6%
Cauliflower / Broccoli ^④	225	45.9%	51.5%	2.6%
Strawberries	208	63.8%	30.7%	5.5%

Sources: Defra (2020) and Andersons

^① Based on the "Available for UK to Consume (Kt)" data from Table 4-2. ^② Cereals includes wheat, barley and oats only. ^③ Volume of liquid milk production provided in million litres' terms. ^④ Refers to fresh cauliflower and broccoli only, frozen excluded. Estimates derived from primary research input.

Table 4-4 also shows that domestically produced sources account for the majority of consumption in most cases, with the exception being cauliflower and broccoli where imports from the EU, particularly Spain, Benelux and Poland, are most prominent. This reflects the UK growing season and the all-year-round nature of demand in the British market. Again, the EU tends to be the main source of imports, especially for beef where Ireland plays a major role. For sheepmeat, the majority of imports emanate from New Zealand and Australia and reflects the seasonal nature of UK lamb production.

4.3 SCOTTISH AGRICULTURE TRADE FLOWS

Drawing upon primary and desk-based research insights, this section provides estimates of Scottish output by geographic market. At the outset, it is important to highlight that there is relatively little Scotland-specific data on sales of agri-food produce by geographic market. This is because most data

are aggregated at the UK level. Furthermore, whilst agri-food companies are able to provide insights on their own businesses, at a sectoral level, particularly barley, dairying and sheep, a significant proportion of Scottish produce is processed in England and there is limited visibility of where that product ends up. With these caveats in mind, the indicative estimates presented in Table 4-5 should be treated with caution. That said, it helps to inform what the key markets are for Scottish produce and gives a helpful indication of the potential exposure to Brexit within each sector.

It is apparent that for most sectors, the internal UK market is by far the most important. Whilst the data presented below focus on direct sales only, England & Wales account for the majority of sales across meat and horticulture. Indirectly, England & Wales is also the main market for processed dairy produce. Furthermore, a substantial proportion of the feed grains used by Scottish farmers is used to produce meat destined for south of the border. The only exception is malting barley where most Scottish produce is used to make whisky which is sold worldwide. Non-EU markets (incl. Canary Islands) account for nearly 30% of seed potatoes' output. Egypt is also another major market.

Table 4-5: Estimated Breakdown of Scottish Agricultural Sales by Geographic Market (2017-19)

Sector	Scottish Production (Kt)	% Sold in Scotland	% to England & Wales	% to NI	% to EU27	% to Non-EU
Wheat	856	~95%	<5%	<1%	Neg.	Neg.
Malting barley	932	~90% ^①	<10%	Neg.	Neg.	Neg.
Other Barley	895	~90%	<5%	3%	3%	Neg.
Beef ^②	167	27%	~64%	≤1%	8%	Neg.
Sheepmeat ^②	61	17.5%	53%	Neg.	29.5%	Neg.
Liquid Milk ^③	1,328	~83%	~17%	Neg.	Neg.	Neg.
Seed Potatoes	284	~12%	~48%	~2%	5%	29%
Other Potatoes	807	10-11%	86-88%	~1%	1-2%	Neg.
Cauliflower / Broccoli ^④	28-30	15-20%	77-83%	<1%	1-2%	Neg.
Strawberries	30	33%	66%	<1%	Neg.	Neg.

Sources: Scottish Government, Defra and Andersons

^① Assumes that the Scottish barley used to produce malt in Berwick is mostly sold back to Scotland ^②Breakdown based on value for 2019 only. Excludes fifth quarter. Some product will be sold to companies situated in England/Wales, further processed, and sold back as finished goods to Scotland. ^③ Volume of liquid milk production is in million litres' terms. Estimated breakdowns based on 2019/20 AHDB data²² which only focus on where the liquid milk is processed. They do not consider where processed dairy products (e.g. cheese) are sold to. Here, it is only possible to get reliable data at a UK level. ^④ Refers to fresh cauliflower and broccoli only, frozen excluded. Estimates derived from primary research input. "Neg" denotes negligible volumes.

4.4 KEY OBSERVATIONS

Although the data might suggest that Scotland is relatively less exposed to the EU versus the UK as a whole, it is not possible to deduce what proportion of Scottish sales to England and Wales are destined for the EU market. This is particularly relevant for sheep meat, beef and dairy products. The Scottish agri-food sector is, therefore, quite reliant on processing facilities south of the border. This issue is particularly relevant for sheep and dairy. For the latter, it is noteworthy that whilst normally processing would take place just over the border in Northern England, this region is also producing a milk surplus, meaning that Scottish milk has to be transported further for processing which adds to cost.

That said, research findings still suggest that the UK internal market is by far the most important for Scottish produce, a point emphasised numerous times in the primary research. At the same time, Brexit is still set to exert a major influence on the Scottish agri-food industry's long-term competitiveness. The specific impacts of Brexit on each agricultural sector are examined in Chapters 5 – 8.

5. BREXIT IMPACT – CEREALS

5.1 TARIFF IMPACTS

5.1.1 UK Imports

The import tariffs that would apply on imports from the EU and non-EU countries under a No Deal scenario for cereals and cereal products are set-out in ad-valorem equivalent (AVE) terms in Table 5-1. On the face of it, it would appear that the tariffs for wheat and barley are very high, estimated at almost 50% on EU imports under a No Deal Brexit. However, it is important to note, that if wheat and barley is imported via a tariff rate quota (TRQ), the resultant tariffs (depicted as the in-quota rate) are substantially lower, at €12/t for feed wheat and barley and €8/t for malting barley. Therefore, in AVE terms the estimated tariffs are just over 6% for imports from the EU with respect to feed wheat and barley and 4.1% for malting barley. Due to the higher price of non-EU imports of wheat and barley obtained from HMRC trade data, the corresponding AVE rates presented in Table 5-1 are lower versus the EU.

Table 5-1 – Price per tonne and estimated Tariffs for UK Cereals Imports – 2017-19 (AVE%)

HS Code	Description	EU			Non-EU		
		Price £/t	AVE %	In-quota AVE %	Price £/t	AVE %	In-quota AVE %
10019900	High quality wheat (excl. seed, durum wheat)①	163	0%①	n/a	228	0%①	n/a
10039000	Feed Barley (excl. seed)	162	48%	6.2%	303	25%	3.3%
10039000	Malting Barley (excl. seed) ②	162	48%	4.1%	303	25%	2.2%
10059000	Maize (excl. seed for sowing)	161	0%	n/a	158	0%	0.0%
11010015	Flour of common wheat and spelt	362	39%	n/a	652	22%	n/a
11071099	Malt (excl. roasted, wheat and flour)	357	30%	n/a	1,225	9%	n/a
11072000	Roasted malt	498	25%	n/a	1,587	8%	n/a

Sources: HMRC and Andersons

① Complicated formula based on a US reference price. No tariffs have been paid in recent years.

② Subject to TRQ limits as set-out in Section 5.2. Assumes exchange rates applied when converting EU CET to UKGT for wheat (€1=0.832) and barley (€1=£0.828) as set-out by the UK Government when publishing the UKGT.

Table 5-1 also shows estimated tariffs for other cereal products, derived from wheat and barley, which would also influence the UK's post-Brexit competitiveness in a No Deal situation. For wheat flour, these are prohibitive (39%) and would act as a significant impediment to imports from the EU. Given that the import tariffs for milling wheat are currently set at zero, it is likely that imports of flour would be replaced by milling wheat, meaning greater volumes of processing within GB. Malt tariffs would also be significant, ranging from 25-30% on imports from the EU. As Scotland imports relatively small volumes of malt, aside from some Scandinavian material, tariffs are not anticipated to have a significant impact.

5.1.2 UK Exports

The No Deal Brexit tariffs which would apply to UK cereals exports to the EU are shown in Table 5-2. Whilst UK exports to non-EU countries are also subject to tariffs, where no free-trade (or rollover) agreement is in place, as these tariffs currently apply and vary greatly from country to country, these are not anticipated to change once the Transition Period ends in January. Therefore, they are not shown.

The estimates show that the tariffs on out-of-quota feed wheat exports would be substantial, estimated at 52% for both wheat and barley. The slight differences between the tariffs on UK exports versus those on imports, shown in the previous section, are to do with the exchange rates and prices used. The price per tonne estimates are converted from Sterling into Euro using an exchange rate of £1=€1.12. Any exports that take place within via a TRQ (in-quota rate) are substantially lower, estimated at 6.6% for

feed wheat, 6.7% for feed barley and 4.5% for malting barley. However, this should also be considered within the wider trade context and the UK's subsequent place in the global market. Primary research participants pointed out that prices for Russian feed wheat are approximately £17-20/tonne lower than the UK and EU. They would still be more competitive than UK feed wheat exports to the EU (via TRQ) under a No Deal Brexit scenario. Therefore, if tariffs apply, then in years when the UK has an exportable surplus, industry participants suggest that it will be more difficult to export to the EU and prices would come under pressure until they become competitive against the likes of Russia which exerts an influence on world market prices used in Agmemod.

Table 5-2: Estimated Tariffs on UK Cereals and Cereal Exports to the EU27 – 2017-19 (AVE %)

HS Code	Description	Price £/t	AVE %	In-quota AVE %
10019900	High quality wheat (excl. seed, and durum wheat)①	162	0%①	n/a
10019900	Wheat (excl. seed, durum wheat)②	162	52%	6.6%
10039000	Feed Barley (excl. seed)	159	52%	6.7%
10039000	Malting Barley (excl. seed)②	159	52%	4.5%
10059000	Maize (excl. seed for sowing)	165	5.6%	0.0%
11010015	Flour of common wheat and spelt	404	38%	n/a
11071099	Malt (excl. roasted, wheat and flour)	427	27%	n/a
11072000	Roasted malt	690	20%	n/a

Sources: HMRC and Andersons

① Complicated formula based on a US reference price. No tariffs have been paid in recent years.

② Subject to TRQ limits as set-out in below.

5.2 TRQ IMPACTS

Table 5-3 details the proposed division of existing EU28 TRQs for wheat and barley between the UK and the EU27 based on a December 2018 agreement²³, which despite objections from other WTO members, have been assumed. The allocations for other cereals (e.g. maize) are provided in Annex III.

Overall, the vast majority (97%) of cereals TRQs have been allocated to the EU27 and for selected cereals a limit of just over 172,300 tonnes could be imported into the UK. Over 70% of this relates to feed wheat and the majority of the remainder relates to malting barley (30,101 tonnes).

With regards to the EU27's allocation, of most interest to the UK will be the 2.29Mt which can be imported from a variety of other countries (excluding the US and Canada). This allocation surpasses the 2Mt of feed wheat which has been exported from the UK to the EU in the past and would come with a relatively low tariff (€12/t). On the face of it, this should mean that UK exports of feed wheat to the EU27 would still be possible, albeit more costly, from January 2021. As mentioned above, with Russia and Ukraine much more competitive than the UK, any TRQ-related price rises would have a significant negative impact on the competitiveness of UK exporters in a No Deal scenario.

For malting barley, it is also worth noting that the 20,789 tonne TRQ limit on future exports to the EU27 could potentially restrict the UK, particularly in East Anglia where significant volumes of malting barley exports to the EU Continent have taken place in the past. These allocations between the UK and the EU27 have been incorporated into the Agmemod modelling analysis below.

Table 5-3 – Proposed Division of Selected EU28 Cereals Import TRQs between EU27 and UK

Description	Country	Order No.	EU28 (t)	EU27 (t)	EU27 Share (%)	UK (t)	UK Share (%)
Quality wheat	Erga Omnes	90075	300,000	300,000	100%	0	0%
Common (feed) wheat (medium and low quality)	USA	94123	572,000	571,943	99.99%	57	0.01%
Feed wheat	Canada	94124	38,853	1,463	3.80%	37,390	96.2%
Feed wheat	Other	94125	2,371,600	2,285,665	96.40%	85,935	3.6%
Feed wheat	Erga Omnes	94133	129,577	129,577	100%	0	0%
Barley	Erga Omnes	94126	307,105	306,812	99.90%	293	0.10%
Malting barley	Erga Omnes	90076	50,890	20,789	40.90%	30,101	59.10%
Preparations derived from malting barley	Other	92905	20,000	20,000	100%	0	0%
Preparations derived from malting barley	Other	92903	100,000	100,000	100%	0	0%
Selected Cereals Sub-total			3,890,025	3,736,249	96.0%	153,776	4.0%
Other Cereals Materials			3,871,943	3,790,116	97.9%	81,827	2.1%
Cereals Total			7,761,967	7,526,365	97.0%	235,603	3.0%

Source: Council of the European Union (2018)

5.3 NTM IMPACTS

Although the HS codes for wheat do not distinguish between milled wheat and feed wheat, depending on the size of the UK harvest each year, the UK often trades significant volumes of these commodities. In recent years, when the UK has had a strong wheat harvest, up to 2 million tonnes of feed wheat have been exported to the EU, particularly countries such as Spain. As Table 4-2 above illustrates, significant tonnages of barley are also exported to the EU (more significant than wheat during 2017-19). Although any exports of malting barley that do take place are primarily exported from East Anglia to the Continent, the imposition of regulatory barriers on UK-EU trade will have some effects on the UK market generally, including Scotland.

Table 5-4 sets-out the estimated NTM costs on average to the sector (i.e. on a probability basis), for selected cereals commodities and associated products. Further information, including NTM estimates on a checked load basis, is provided in Annex III. As shipping wheat and barley via RoRo transport is costly, the focus here is on bulk-shipments only, as this reflects reality in most cross-border grain trade. Whilst the size of shipments can vary from 3,000 tonnes to 60,000 tonnes or more, a 'typical' shipment size of 30,000 tonnes was assumed. The associated NTM costs are miniscule, coming in at about 0.1% AVE under both scenarios.

NTMs are, therefore, of a low concern for grains provided they have the initial approval to enter the EU. Of course, the NTM estimates compiled during this study are based on UK and EU standards being harmonised. If these diverge in future, then NTM costs would increase, perhaps significantly.

Table 5-4: Estimated NTM Costs to the Sector- Selected Cereals & Cereal Products (AVE %)

HS Code	Description	UK Imports from EU27		UK Exports to EU27	
		FTA	No Deal	FTA	No Deal
10019900	Wheat (ex. seed) (Bulk-shipped (30Kt))	0.1%	0.1%	0.1%	0.1%
10039000	Barley excl. seed (Bulk-shipped)	0.1%	0.1%	0.1%	0.1%
11010015	Wheat flour (RoRo (28t))	2.7%	4.2%	2.4%	3.9%
11010015	Wheat flour (LoLo (28t))	2.5%	3.9%	2.3%	3.5%
11071099	Malt (RoRo)	3.2%	5.1%	3.2%	5.1%
11071099	Malt (LoLo)	3.3%	5.0%	3.3%	5.0%

Source: The Andersons Centre (2020)

Table 5-4 also outlines NTM AVEs for wheat flour and malt as both these products are closely linked with wheat and barley. According to the primary research, significant volumes of milled wheat flour (circa 500Kt) are imported into the UK annually from non-EU countries (e.g. US, Canada and the Ukraine) principally via ports such as Southampton and Tilbury. There are also significant amounts of milling flour products (circa 230Kt) exported into the EU27, particularly Ireland.

NTM AVEs for milled wheat flour are projected to range from 2.3% to 4.2% under both scenarios. As elsewhere, such costs will have an impact on trading margins and will need to be priced into the system, most likely in the form of lower farmgate prices or higher costs to end-users. In the flour sector, as a greater number of stakeholders use RoRo transport and given that the importance of the susceptible Calais-Dover route, any exceptional delays could have big repercussions, particularly if key delivery windows are missed and penalties ensue.

According to industry experts, malt exports represent nearly 15% of UK production, mostly to non-EU markets, principally Japan, the US and Vietnam. That said, the domestic market remains the primary driver for UK production. This is particularly the case in Scotland where the vast majority (90%+) of the malt produced from Scottish barley is used in whisky production. Relatively few imports take place.

Estimated NTM AVEs range from 3.2% to just over 5% under a No Deal. Costs are slightly higher with RoRo, due to the impact of time delays for loads which are subject to physical checks and sampling. One of the key concerns is the time required to get phytosanitary certificates for exports to third countries. Any additional delays arising from Brexit (e.g. more time needed to get lab results) could start to have a significant impact on securing export deals.

It is important to emphasise that the estimates presented here primarily relate to outputs. The impact of NTMs on key inputs also need consideration. This is not just in terms of primary raw materials but could potentially stretch back as far as farm-level inputs. At present, whilst the UK and the EU remain harmonised, the potential impact is not that noticeable. However, if/when the UK and the EU diverge this could cause issues for the malting industry (e.g. GM; banning of glyphosate). Despite the above concerns, the prospect of trade barriers on UK-EU trade is a relatively low concern for the malting sector. Of far greater concern is the impact of tariffs on exports of Scottish whisky to the US. If these were removed, it could result in a significant boost to Scottish exports which are estimated to be 20-25% lower this year due to a combination of the US tariffs and the Covid Crisis.

5.4 LABOUR

Whilst migrant workers are present at both farm and at processing levels, the ending of Free Movement was not cited as a major issue by cereals' sector primary research participants. Particularly as it is believed that most migrant workers would quite easily qualify for 'settled status'. Some acknowledged that obtaining new labour could pose challenges if competition for workers increases from elsewhere.

5.5 EFFECTS ON UK OUTPUT AND TRADE

Table 5-5 outlines the projected short-run (2021) and longer-term (2025) Brexit impacts for wheat and barley by scenario vis-à-vis the Base in terms of production value and quantity, prices and trade. It must be highlighted that because Agmemod 'solves' its model equations based on net exportable surpluses for each country, these do not distinguish between the EU and non-EU. Therefore, it is not possible to present results on projected changes to trade with the EU directly. Instead, overall changes to exports and imports are provided. Furthermore, as the main focus of Agmemod is to provide market outlook and growth projections, the baseline also evolves over time. An explanation of the reasoning behind why Base changes between the short-run and long-term has not been provided in detail here. Accordingly, the main focus of the projections should be on the percentage change against the Baseline in each period. Immediately after Table 5-5 further commentary is provided for wheat and barley.

Table 5-5: Projected UK Wheat and Barley Brexit Impact by Scenario (% Change vs Baseline)

Commodity and Parameter	2017-2019 Baseline	FTA 2021 % Change	FTA 2025 % Change	No Deal 2021 % Change	No Deal 2025 % Change
Wheat					
Output (£m)	2,207	0.0%	0.0%	2.0%	5.3%
Output (Kt)	14,872	0.0%	0.0%	0.0%	3.3%
Domestic use (Kt)	16,035	0.1%	0.1%	1.1%	1.2%
Price (£/t)	148	0.0%	0.0%	2.0%	2.0%
Exports (Kt)	705	-0.4%	-0.3%	-6.4%	9.4%
Imports (Kt)	1,868	0.2%	0.2%	3.0%	-7.0%
Barley					
Output (£m)	999	0.0%	0.0%	-10.3%	-17.4%
Output (Kt)	7,242	0.0%	0.0%	0.0%	-7.8%
Domestic use (Kt)	6,107	0.1%	0.1%	2.2%	0.5%
Price (£/t)	138	0.0%	0.0%	-10.3%	-10.5%
Exports (Kt)	1,230	-0.2%	-0.3%	-7.1%	-32.7%
Imports (Kt)	94	0.0%	0.0%	7.7%	6.3%

Sources: Andersons, Defra and WUR

5.5.1 Wheat

FTA Scenario

Based on the Agmemod analysis, minimal changes are projected under the FTA scenario. This is because NTM costs are minimal for bulk shipments of grain and the industry is largely accustomed to trading across non-EU markets already. Whilst there may be some issues with specific customer specifications if, for instance, feed wheat is to be exported to the EU in the future, which could cause some time-delays, these are not anticipated to be significant. Furthermore, as the bulk-shipping of grain is quite independent of RoRo freight trade, the industry does not anticipate major issues occurring with any delays that might occur on the Dover-Calais route for example (although this could be an issue for flour products). Where problems could arise are on shipments of inputs and time delays when disease pressure is at its peak. This would be of particular concern in the first six months following the end of the Transition Period. However, with good supply-chain planning, these should be avoided.

Whilst 1 or 2 industry participants expressed some concern about the impact of NTM costs on livestock trade, the Agmemod analysis for grazing livestock (see Section 7.4) suggests that these will not be problematic under an FTA scenario.

No Deal

Under No Deal, more noticeable changes are projected. For wheat, production increases are forecast over the longer-term. This is partly due to increased demand for animal feed but as barley is forecast to experience price declines due to the imposition of trade barriers (including an in-quota tariff on any exports to the EU), its relative profitability versus wheat will decline. This, in turn, means that more farmers would switch towards growing wheat, driving up its crop area and production which Agmemod forecasts will rise by over 5% under No Deal in 2025. Given the relative importance of barley versus wheat in Scotland, this could have a more severe impact on Scottish output, where climatic conditions are deemed to be more conducive to growing barley than wheat.

Prices are forecast to increase by 2% driven by domestic demand, particularly in animal feed due to increased demand from the dairy and beef sectors. The imposition of tariffs on any imports from the EU27 would also support domestic wheat prices. Long-term imports are forecast to decline as the UK relies more on domestic production and given the significant increases in crop area and production, increased exportable surpluses are forecast.

With tariffs applying on trade with the EU, the UK will be more reliant on global markets. These are of course volatile and highly dependent on conditions in other regions (e.g. Black Sea). Although Agmemod does not model specific effects of bilateral trade between EU Member States and associated countries (e.g. Ukraine), it is anticipated that the UK would face further competition from the Black Sea region. Primary research input suggests that, although the in-quota tariff is much lower than the default (€95/tonne), the Black Sea region has been very competitive in recent years and has been encroaching on Mediterranean markets. Although the UK is currently competitive when exporting to Spain any further costs (e.g. tariffs) would erode its position.

5.5.2 Barley

FTA Scenario

Relatively minor changes are forecast as explained for wheat above. There is a slightly more pronounced decline in exports versus wheat because, as Chapter 4 illustrates, greater volumes of barley are exported to the EU, but these changes are still minor.

No Deal

Significant declines in the monetary value of output are projected by Agmemod. A 10% decline is forecast in the short-term due to the price decrease brought about by the imposition of in-quota tariffs on exports to the EU. Longer term, the value of output falls by over 17% as production (down by 7.8% versus Baseline) reacts to the lower prices and more farmers grow wheat which is considered to be relatively more profitable. Exports to the EU also fall significantly, in the short-term being affected by the in-quota tariff (€12/t) and longer-term, lower production coupled with some increased domestic use (particularly feed) leave a smaller exportable surplus, leaving projected exports some 33% lower.

Curiously, there is a rise in barley imports longer-term (up 6.3% against the Baseline). This is likely to relate to more UK farmers switching towards wheat due to the price impacts, meaning that some barley imports might need to take place. It is arguable that Agmemod is overplaying the extent to which imports rise for barley under No Deal.

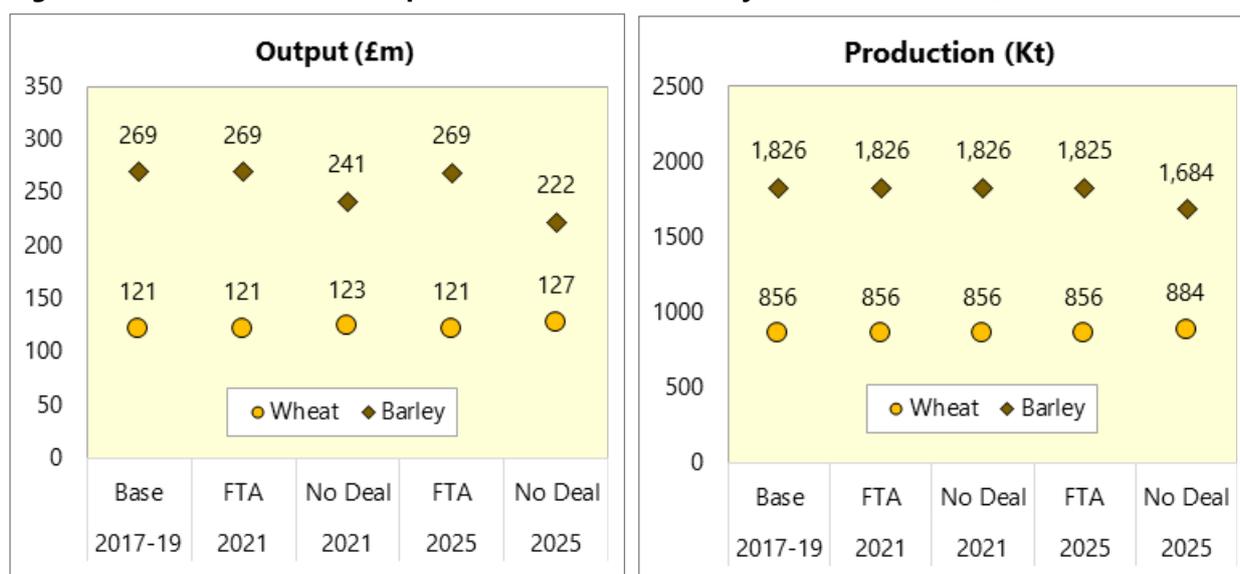
5.5.3 Implications for Scottish Output

On the face of it whilst a No Deal looks to be positive for wheat, the situation for barley is much more concerning, particularly given its importance in Scotland. Figure 5-1 depicts the projected impacts of the percentage changes to output value and production tonnages derived from Agmemod and imposes these against the 2017-19 Base period to give an indication of their impact on Scottish cereals output.

In the Base period, combined wheat and barley output is estimated at £390 million. There are negligible changes under the FTA scenario but under a No Deal, short-term output declines by £25 million and longer term output is projected to be £40 million lower. As Figure 5-1 clearly shows, this is driven by barley where declines of £47 million are projected over the longer term, which more than offsets that £7 million increase in wheat. As discussed above, the changes are principally due to price and its onward effects on growers switching towards wheat as it is more profitable than barley.

In tonnage terms, long-term barley production declines by 142Kt against the Base period, whilst wheat is 28Kt higher. Admittedly, the dynamics of the malting barley sector have not been considered in great detail within the analysis below. This may counteract somewhat the declines projected for barley below, particularly if whisky exports can resume their pre-Covid growth in other markets, buoyed by future UK trade deals and if the UK is successful in getting the whisky tariff on exports to the US removed, leading to a recovery in that market.

Figure 5-1: Scottish Cereals Output & Production Effects by Scenario (2021-25)



Sources: The Andersons Centre and Wageningen University and Research (WUR)

5.6 IMPLICATIONS FOR SCOTTISH CEREAL FARMING

Combining the Agmemod results above, primary research input and insights from previous studies, Table 5-6 shows the projected impact of each Brexit scenario on Scottish cereals farms vis-à-vis the status quo (2018/19). These impacts were assessed at the farm-level using information obtained from the Scottish Farm Business Income (FBI) annual estimates²⁴. This has been done via a static subtraction from the FBI results and further detail on the assumptions used is set-out in Annex IV where additional farm-level analysis using Andersons’ Scottish Loam Farm Model is also provided.

Unsurprisingly, the FTA scenario impacts are limited and despite the imposition of some NTMs on cross-border trade. For instance, fertiliser costs are estimated to rise by 1%. Crop protection costs are up by 3%. Overall, crop-specific variable costs are 3% higher, which leads to a 1.5% decline in crop-specific gross margins.

As there are some livestock enterprises within the Scottish FBI cereals farm figures, changes to output and variable costs have also been considered (see Section 7.6 for more analysis). This results in a slight rise in total agricultural output and variable costs. Fixed costs are also slightly higher due to an increase in regular labour (assumed to rise by 2%, approximately half the increase in casual labour where there will be greater strain due to shortages in the horticultural sector).

The overall margin from agricultural production declines by 13.2% and when support (kept constant) is considered, the agricultural business surplus is 3.6% lower. This suggests that under an FTA cereals farming will continue to be profitable.

Under a No Deal, the 10.3% price decline for barley is the major factor behind the 3.7% fall in crops' output. The reason the overall crop output decline is not as pronounced is because a 2% price increase for wheat has been assumed and the prices of other crops (e.g. oats and OSR) have been kept constant. Variable costs meanwhile are forecast to rise by 6.3% due to more pronounced increases in fertiliser (+3%) and crop protection (+9%) against the Base period. This culminates in a crop-specific gross margin decline of 8.4%.

Overall production margin is estimated to decline by 74%. Although it is still positive, it suggests that cereals farms will come under added pressure under a No Deal. In recent years, when the UK had an exportable surplus of feed wheat, markets were easily found on the continent. Whilst exports will still be possible post-Brexit (albeit with an in-quota tariff of €12/tonne), their competitiveness against Black Sea producers will be eroded significantly.

The overall agricultural business surplus is some 20% lower. This suggests that the profitability of Scottish cereals farming will decrease quite significantly under a No Deal.

Table 5-6 – Projected Impact of Brexit on Scottish Cereals Farming (£/Farm)

Parameter	18/19 (Base)	FTA	% Ch.	No Deal	% Ch.
Crops Output (excluding support)	157,061	157,051	0.0%	151,245	-3.7%
Crops-Specific Variable Costs	49,979	51,556	3.2%	53,110	6.3%
Crops-Specific Gross Margin	107,081	105,495	-1.5%	98,135	-8.4%
Total Agricultural Output	182,578	182,680	0.1%	176,925	-3.1%
Total Agricultural Variable Costs	56,730	58,339	2.8%	59,780	5.4%
Total Agricultural Fixed Costs	113,430	113,559	0.1%	113,912	0.4%
Margin from Agricultural Production	12,418	10,782	-13.2%	3,233	-74.0%
Agricultural Support	33,184	33,184	0.0%	33,184	0.0%
Agricultural Business Surplus	45,602	43,966	-3.6%	36,417	-20.1%

Sources: Scottish Government (Scottish Farm Business Income (FBI) Publication) and Andersons

5.7 CONCLUDING REMARKS

Although profitability is down slightly under the FTA scenario, Scottish cereals farms would continue to be competitive. The situation is much more concerning under a No Deal, particularly if as a result of the trade deals that the UK strikes elsewhere, there is greater competition from imports in the livestock sector which, in turn, would erode domestic demand for feed wheat and barley.

Barley is of most concern under a No Deal. The ability of Scottish whisky distillers to continue to grow export markets will be crucial as Scotland is set to become more reliant on revenues from malting barley production to safeguard the profitability of its arable farming operations.

6. BREXIT IMPACT – DAIRYING

6.1 TARIFF IMPACTS

Tariffs applicable within the dairy sector are complex and the UK Government's Global Tariff schedule contains 151 tariff lines for dairy commodities with additional products (e.g. proteins and pet food) also containing significant amounts of dairy ingredients. For the purposes of this study, the tariff information presented on UK imports and exports is based on the top-5 most frequently traded dairy commodities between the UK and the EU. This includes two categories of butter, hence six tariff lines are shown. It does not include liquid milk because the vast majority of this trade relates to cross-border movements on the island of Ireland. The industry experts participating in this study suggest that overseas liquid milk trade from Scotland is negligible. That said, it is a key feature of internal UK trade with England and Wales, so would become a major issue if trade barriers were to arise within the UK in future.

6.1.1 UK Imports

Table 6-1 shows the estimated tariffs that would be applicable on imports of selected dairy products into the UK from both the EU and non-EU in the event that the UKGT becomes applicable from January. These estimates are presented in AVE terms. However, as Annex III shows, tariffs for dairy products more frequently combine a specific component (e.g. £10/100kg for yogurt (HS code: 04031091)) and a percentage component (e.g. 8% for yogurt). These are called compound tariffs. There are also examples of dairy tariffs being based on a fixed amount (e.g. £158/100kg for butter).

With this in mind, Table 6-1 shows that for imports from the EU, the application of the UKGT would have a major impact on the competitiveness of EU produce. For cheese, the estimated tariffs would range from 25% (processed) to 53% for cheddar and mozzarella. Tariffs for butter imports from the EU would be in the 36-40% range, with yogurt tariffs estimated at 17% AVE. This would make it very difficult for EU competitors such as Ireland and the Netherlands, for whom the UK is a major market.

Table 6-1: Estimated Tariffs for UK Imports of Dairy Products – 2017-19 (AVE%)

HS Code	Description	EU		Non-EU	
		£/t	AVE%	£/t	AVE %
04031091	Yogurt	1,166	17%	1,542	14%
04051011	Natural butter of a fat content, by weight, of >= 80% but <= 85%, in immediate packings of a net content of ≤ 1kg)	4,418	36%	12,951	12%
04051019	Natural butter of a fat content, by weight, of >= 80% but <= 85% (in packings of > 1kg net)	3,936	40%	2,828	56%
04061030	Fresh Mozzarella, whether or not in a liquid, of a fat content, by weight, of <= 40%	2,925	53%	4,155	37%
04063031	Processed cheese, not grated or powdered, of a fat content, by weight, of <= 36%)	4,722	25%	12,978	9%
04069021	Cheddar (excl. grated/powdered and for processing)	2,615	53%	3,341	42%

Sources: HMRC and Andersons

In many cases, the estimated tariffs for UK imports from non-EU countries are lower in AVE terms, chiefly because of the relatively high prices used, based on HMRC data. However, these price estimates need to be treated with caution. For instance, imports of butter in packs of ≤1kg averaged at approximately £33,000 per annum during 2017-19. Corresponding imports from the EU averaged at almost £115 million. There are similar issues with processed cheese where non-EU imports were just over £100,000 (high-end product with different price structures) whilst EU imports surpassed £121 million.

Overall, the estimates suggest that in a No Deal Brexit, imports from the EU would become uncompetitive in most cases and this would present opportunities for domestic UK producers, provided that any trade deals that the UK completes post-Brexit (e.g. with New Zealand and Australia) do not grant those countries with significantly increased market access.

6.1.2 UK Exports

For UK dairy exports to the EU, the application of the EU Common External Tariff (CET) would exert a severe negative impact, as shown in Table 6-2. As Annex III also shows, the EU CET for dairy products are structured in a similar manner to the UKGT. When expressed in AVE terms using 2017-19 trade data, the tariffs for cheese range from 31% to 55%. Cheddar has a 45% tariff. Tariffs for butter would surpass 40% and would be made uncompetitive, whilst the AVE tariff on yogurt (19%) would erode the UK's competitive position, although some exports might still be possible, particularly if Sterling is weak.

Table 6-2: Estimated Tariffs on UK Dairy Product Exports to the EU27 – 2017-19 (AVE %)

HS Code	Description	Price £/t	AVE %
04031091	Yogurt	1,007	19%
04051011	Natural butter of a fat content, by weight, of $\geq 80\%$ but $\leq 85\%$, in immediate packings of a net content of $\leq 1\text{kg}$)	4,103	41%
04051019	Natural butter of a fat content, by weight, of $\geq 80\%$ but $\leq 85\%$ (in packings of $> 1\text{kg}$ net)	3,934	43%
04061030	Fresh Mozzarella, whether or not in a liquid, of a fat content, by weight, of $\leq 40\%$	2,982	55%
04063031	Processed cheese, not grated or powdered, of a fat content, by weight, of $\leq 36\%$)	3,997	31%
04069021	Cheddar (excl. grated/powdered and for processing)	3,314	45%

Sources: HMRC and Andersons

As with imports of EU dairy products into the UK, a No Deal Brexit would deal a severe blow to UK exports to the EU. On balance, the UK should be able to engage in import substitution so that domestic sales could replace lost exports to the EU. For many dairy products, the UK is not self-sufficient, so either the domestic dairy industry would need to expand (creating short-term issues around product mixes and processing capacity) or the UK would have to secure trade deals elsewhere, or lower its tariffs, in order to meet its supply needs without increasing consumer prices significantly.

6.2 TRQ IMPACTS

As with cereals, TRQs provide opportunities for a limited quantities of dairy imports to continue to access the UK market at low, or much reduced tariff rates. Table 6-3 sets out the division of EU28 TRQs between the UK and the EU27. For butter, just over 27.5Kt tonnes (32% of total) will be allocated to the UK, via a TRQ that only New Zealand has access to. Therefore, the 69Kt of butter exported from the EU27 to the UK would be unable to access the UK via TRQs and tariffs would be payable.

For cheese, the allocation to the UK (circa 9Kt) represents just under 11% of the total EU28 TRQ. This is mostly for cheddar cheese from both Canada (4Kt) and New Zealand (2.6Kt). New Zealand would also have the opportunity to export 2.3Kt of other cheese to the UK. Opportunities for the EU27 to access the UK cheese market via TRQs would be minimal with just 64 tonnes of cheddar available.

For UK exports, there would continue to be opportunities to export some volumes of butter and cheese (via TRQs allocated on an Erga Omnes basis) and would be subject to in-quota tariffs of approximately 21% and 6% respectively²⁵. However, the UK would be up against global competitors like New Zealand. Furthermore, as Irish cheddar and butter exports would effectively be shutout of the UK market, Irish

producers will be under pressure to export greater volumes to other EU countries, thus lowering prices in the EU27. Again, this would indicate that the UK would be best positioned to supplant EU27 imports with domestic produce. For butter, UK exports to the EU27 (35Kt) are approximately half of the corresponding imported volumes. For cheddar, the UK exported approximately 68Kt to the EU27 during 2017-19, whilst 107Kt arrived from the EU, mostly Ireland. For some speciality chesses (e.g. Emmental, Feta, Gouda etc.), it is likely that significant volumes will continue to arrive from the EU27, albeit with tariffs applied (in excess of 30% in many cases) which will significantly increase consumer prices.

Table 6-3: Proposed Division of Selected EU28 Dairy Import TRQs between EU27 and UK

Description	Country	Order No.	EU28 (t)	EU27 (t)	EU27 Share (%)	UK (t)	UK Share (%)
Skimmed-milk powder	Erga Omnes	94590	68,537	68,537	100%	0	0%
Butter ^①	Erga Omnes	94599	11,360	11,360	100%	0	0%
Butter	NZ	94182, 94195	74,693	47,177	63.20%	27,516	36.80%
Total Butter			86,053	58,537	68.0%	27,516	32.0%
Cheese (pizza)	Erga Omnes	94591	5,360	5,360	100%	0	0%
Cheese -Emmental	Erga Omnes	94592	18,438	18,438	100%	0	0%
Cheese (Gruyère, Sbrinz)	Erga Omnes	94593	5,413	5,413	100%	0	0%
Cheese (processing)	NZ	94515	4,000	1,670	41.70%	2,330	58.3%
Cheese (processing)	Australia	94522	500	500	100%	0	0%
Cheddar ^②	Erga Omnes	94595	15,005	14,941	99.6%	64	0.40%
Cheddar cheese	NZ	94514	7,000	4,361	62.3%	2,639	37.7%
Cheddar cheese	Australia	94521	3,711	3,711	100%	0	0%
Cheddar cheese	Canada	94513	4,000	0	0%	4,000	100%
Other cheeses	Erga Omnes	94596	19,525	19,525	100%	0	0%
Total Cheeses			82,952	73,919	89.1%	9,033	10.9%
Total Dairy Products			237,542	200,993	84.6%	36,549	15.9%

Source: Council of the European Union (2018), Andersons (2020)

① Subject to in-quota tariff (€948/t), equating to 21.4% AVE on 2017-19 trade for UK exports to the EU27.

② Subject to an in-quota tariff of €210/tonne, equating to 5.6% in AVE terms on 2017-19 trade.

6.3 NTM IMPACTS

The estimated NTM AVEs are provided for selected dairy products in Table 6-4. These are provided on a probability basis (further information on "checked loads" is in Annex III). Checked (unlucky) loads are subject to the full range of regulatory checks. Probability-based estimates are averaged out over 100 loads and takes account of physical check rates (10% under an FTA, similar to CETA and 30% under a No Deal²⁶). For SMEs that export relatively few consignments (e.g. less than 50 per annum), the impact of a load being subject to the full range of regulatory checks is far greater than for a large company dispatching scores of loads each week.

For more perishable products such as yogurts, NTM AVEs are more sizeable ranging from 2.8% to 7%. As yogurts are lower priced than other dairy products (£1,166/t for imports and £1,007/t for exports), NTM costs are higher in AVE terms due to certification costs etc. being spread across a lower load value.

Butter NTM AVEs are significantly lower than yogurts because it is higher priced, much less perishable, and therefore, only subject to small levels of value deterioration. Estimated AVEs range from 0.8% to 1.8%. This implies that whilst NTMs will add bureaucracy and the need to carry greater stocks to mitigate the impact of regulatory checks, their impact would be small. Under an FTA scenario, this would permit trade to continue much the same as present: a view shared by most primary research interviewees.

For cheese products, NTM AVEs range from 1% to 2.7%, with estimates under an FTA scenario generally 1 percentage point lower than their No-Deal equivalents. The AVEs are somewhat higher for cheese than butter due to their lower prices, based on HMRC data.

Overall, the NTM estimates presented here align well with the primary research input, suggesting that although these costs could be problematic in specific cases (e.g. load being subject to the full range of physical checks, where AVEs often surpass 25% in a No Deal scenario). On the whole, they are not of grave concern. Some interviewees suggested that the NTM cost estimates put forward by other studies (e.g. 8% cited by a recent LSE study²⁷) were over-estimating their true costs. The results presented in Table 6-4 tend to support this viewpoint.

Table 6-4: Estimated NTM Costs - Selected Dairy Products for UK-EU Trade (AVE %)

HS Code	Description	UK Imports from EU27		UK Exports to EU27	
		FTA	No Deal	FTA	No Deal
04031091	Yogurt (LoLo)	3.7%	6.1%	4.3%	7.0%
04031091	Yogurt (RoRo)	2.8%	5.4%	3.2%	6.2%
04051011	Butter (packs ≤1kg) (LoLo)	1.0%	1.6%	1.1%	1.8%
04051011	Butter (packs ≤1kg) (RoRo)	0.8%	1.5%	0.8%	1.6%
04051019	Butter (packs >1kg) (LoLo)	1.1%	1.8%	1.1%	1.8%
04051019	Butter (packs >1kg) (RoRo)	0.9%	1.6%	0.9%	1.6%
04061030	Fresh Mozzarella (LoLo)	1.5%	2.4%	1.5%	2.4%
04061030	Fresh Mozzarella (RoRo)	1.2%	2.1%	1.1%	2.1%
04069021	Cheddar (LoLo)	1.7%	2.7%	1.3%	2.1%
04069021	Cheddar (RoRo)	1.3%	2.4%	1.0%	1.9%
04063031	Processed Cheese (LoLo)	1.7%	2.7%	1.3%	2.1%
04063031	Processed Cheese (RoRo)	1.3%	2.4%	1.0%	1.9%

Source: The Andersons Centre (2020)

6.4 LABOUR

Migrant workers feature quite prominently within the Scottish dairy processing sector. That said, given the more year-round nature of operations, migrant workers tend to be employed on a full-time basis. Industry participants contributing to this study believe that most workers would quite easily obtain 'Settled Status'. Again, there was an acknowledgement that sourcing new workers from the EU could become more problematic in future, particularly if local labour was unavailable. This would, in turn, create inflationary pressures. Some believe that with the onset of the Covid Crisis recruiting indigenously could become more viable. There were calls for greater flexibility in the UK's post-Brexit migrant workers' schemes so that workers at an operative level could be recruited if needed (i.e. the salary thresholds were made attainable). Accordingly, whilst there is scope for labour costs to rise with Free Movement

ending, it is not seen as that problematic in dairying (versus tariffs etc.) provided costs are marginal and could be passed on elsewhere. At farm-level, there could also be some impact on labour costs as there have been increasing numbers of East Europeans working on dairy farms in recent years.

6.5 EFFECTS ON UK AND SCOTTISH OUTPUT AND TRADE

Table 6-5 presents the Brexit scenario projections for the dairy sector arising from the tariff, NTM and TRQ analysis above. It focuses on three key product areas namely, butter, cheese and the aggregated effect on UK milk production and farmgate prices. Thereafter, an analysis is provided for each Brexit scenario.

Table 6-5: Projected UK Dairy Output by Brexit Scenario

	2017-19 Baseline	FTA 2021 % Ch	FTA 2025 % Ch	No Deal 2021 % Ch	No Deal 2025 % Ch
Butter					
Output (£m)	756	0.8%	0.0%	13.8%	12.6%
Output (Kt)	157	0.0%	-0.8%	-5.8%	-6.8%
Consumption (Kt)	191	0.0%	0.0%	-1.3%	-0.8%
Prices (£/t)	4,804	0.8%	0.8%	20.9%	20.8%
Exports (Kt)	46	0.0%	0.0%	-2.3%	-2.4%
Imports (Kt)	80	0.0%	0.0%	3.7%	3.9%
Cheese					
Output (£m)	1,463	1.5%	1.5%	37.4%	37.9%
Output (Kt)	434	0.2%	0.2%	3.4%	3.6%
Consumption (Kt)	777	-0.1%	-0.3%	-1.8%	-5.5%
Prices (£/t)	3,374	1.3%	1.3%	32.9%	33.1%
Exports (Kt)	85	0.0%	0.0%	4.4%	6.1%
Imports (Kt)	428	-0.2%	-0.7%	-5.2%	-12.0%
Milk Supply & Demand					
UK Milk Output (£m)	4,424	0.6%	0.6%	14.6%	14.3%
Overall UK Milk Production (Kt)	14,933	0.2%	0.2%	4.7%	4.1%
Consumption (Drinking Milk) (Kt)	14,103	0.0%	0.0%	-0.5%	-0.5%
Farmgate milk prices (ppl)	29.6	0.4%	0.4%	9.4%	9.8%

Sources: Andersons, Defra and WUR

6.5.1 Butter

FTA Scenario

As in other sectors, relatively minor changes are projected. Any changes which are forecast are chiefly a reflection of the imposition of NTMs on cross-border trade with the EU. In the short-term output value rises, driven by a corresponding increase in prices. However, there is little change in production volumes or quantity of imports or exports and as a result, consumption remains largely unchanged. Longer-term, the production volume declines, despite prices retaining their 0.8% premium on the Base. This is partly due to milk being used elsewhere, particularly in cheese production.

No Deal

Here, the changes are much more pronounced as tariffs are imposed on imports from the EU from 2021. Prices are estimated to rise by almost 21% and this, in turn, helps to drive revenue increases of nearly

14%, despite a 5.8% drop in production volumes. Although the UK is an importer of butter, it is being out-competed by cheese, where price increases are in the region of 33% and is viewed as being more favourable to produce based on Agmemod modelling. Due to the increased prices domestically, it is unsurprising that imports rise by 3.7% short-term. It is anticipated that this will be mostly from the likes of New Zealand (which has a TRQ) and other countries where, despite the tariffs, the domestic price increases will make the UK attractive. The EU is expected to lose out. As Agmemod does not segment EU and non-EU imports it is not possible to deduce by how much EU imports decline.

Longer term, the price and output gains will fall back slightly, but prices are still attractive enough to permit a further slight rise in imports. Consumption is 0.8% lower than the Base with higher prices causing reduced demand. Output remains lower as milk usage tends to be utilised by the cheese sector.

6.5.2 Cheese

FTA Scenario

Again, small increases in output value (+1.5%) are forecast due to price increases of 1.3%. Production quantity is also marginally higher as NTM costs decrease the competitiveness of imports from the EU27. The higher prices also mean that more UK cheese is used domestically, despite the slight decrease in consumption. These findings reflect the primary research input which suggests that the imposition of trade barriers under an FTA scenario would bring some small benefits to British cheese producers.

No Deal

As noted above, the 33% increase in prices will drive increased production in the short-term and lead to output value rising by over 37%. Given the extent of these price increases, it is unsurprising that consumption falls (by 1.8% short-term). Arguably, one might anticipate that such a price increase would lead to a greater decline in demand. However, some industry participants opined that demand for cheese would hold up quite well under a No Deal and some imports of high-end continental cheeses would continue, despite tariffs. This opinion appears to be substantiated by the Agmemod projections where short-term imports are forecast to be 5.2% lower, but have not collapsed. As with butter, a greater proportion of imports are likely to come from non-EU countries, attracted by the higher UK prices.

Long-term, a further slight increase in prices is forecast as the UKGT safeguards the domestic UK market. However, the willingness of consumers to continue to bear such high prices dissipates as UK domestic consumption declines by 5.5% against the Baseline projections. This in turn affects imports which are forecast to decline by 12% against the Baseline in 2025. As UK exporters adjust to the changed conditions, more are likely to focus on the domestic market as it is easier to fulfil domestic demand than serving overseas markets.

6.5.3 Impact on Overall Milk Production and Prices

Although Agmemod produces projections for several other dairy commodities (e.g. cream and milk powder), these have not been focused on in this Summary Report. Instead, to relate the dairy market changes to the situation at farm-level in the UK and Scotland, Table 6-5 also includes projections for overall milk production and prices in addition to butter and cheese.

FTA Scenario

Reflecting the FTA forecasts for butter and cheese, relatively small changes are anticipated if the UK agrees a trade deal with the EU. However, some upturn in farmgate prices (+0.4%) is forecast which, as Section 6.5.4 shows helps to boost farm incomes slightly. Drinking milk consumption, traditionally accounting for nearly half of British milk production is not projected to change.

No Deal

Output is forecast to rise by over 14% driven mainly by buoyant prices for products such as cheese and butter on the UK market. Drinking milk consumption is forecast to decline only slightly (-0.5%) as it is a staple product and its' demand is relatively inelastic. For farmers, price rises exceeding 9% are forecast which would be a significant boost to incomes. This in turn drives production increases (4-5%). This reflects the views of industry participants that the dairy industry is one of the farming sectors most likely to gain from the imposition of trade barriers with the EU.

Two key caveats merit mention in a No Deal scenario. Firstly, the NI Protocol which is designed to protect the all-island economy in Ireland coupled with the UK Government's promise of "unfettered access" to the GB market could mean that the significant volumes of milk (circa 700 million litres/year) transported from NI to the Republic for processing are likely to be brought back into NI again, subject to some limited additional processing, and sold as British on the UK market. It is also conceivable that milk produced in the Republic of Ireland and exported to GB directly, could also be routed via and further processed in NI, thus enabling it to qualify for unfettered access as well. It is possible that this could account for a significant proportion of the production increases for dairy products in the UK market.

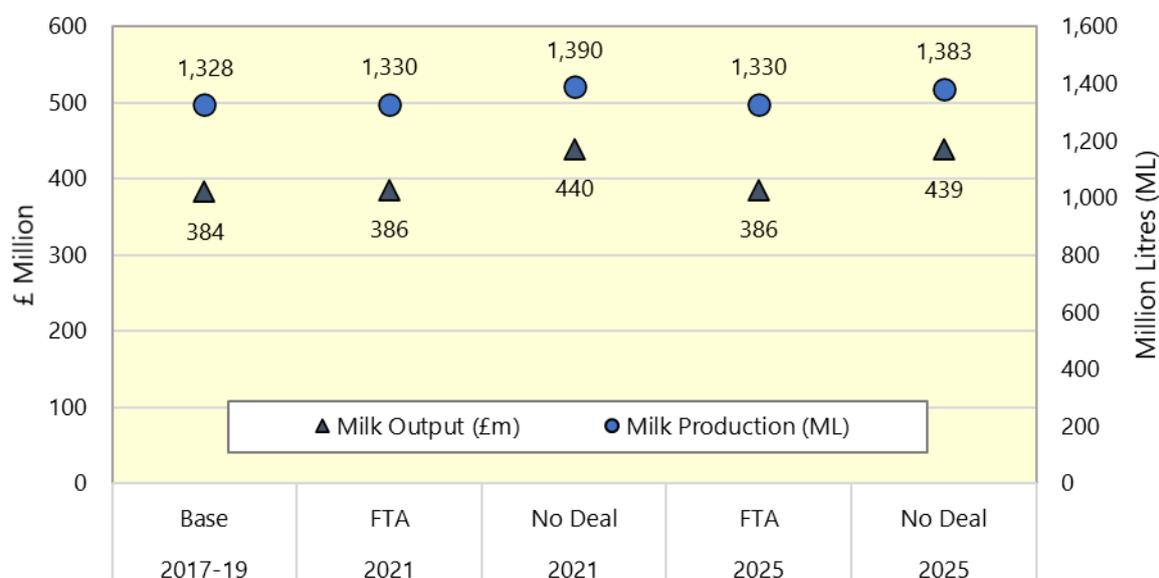
As with other sectors, if the UK completes FTAs with the likes of New Zealand and the US which permits a significant increase in imports from these countries (at lower prices), then much of the gains that farmers might be able to achieve would be eroded.

6.5.4 Implications for Scottish Milk Output

To illustrate the impact of Brexit scenario over the short-run (2021) and long-term (2025), Figure 6-1 depicts the impact of the percentage changes in milk production and value forecast by Agmemod and applies them to Scottish output estimates vis-à-vis the 2017-19 period (Base). As noted above, minimal changes occur under an FTA, provided the UKGT schedule is applied and safeguards Scottish producers.

Under No Deal, Scottish output is forecast to increase by about £57 million in the short-term as markets adjust to the sudden imposition of tariffs and trade barriers with the EU. Longer-term some of these gains are eroded slightly but still some £55 million ahead of the Base period. This translates into a 65 million litre increase in milk production in 2021 which decreases slightly in 2025 to 1,385 million litres. On the face of it, the increased output looks positive for farmers. That said, the caveats above calls for these projections to be treated with some caution. Furthermore, some industry participants expressed concern that significant volumes of Scottish milk are being processed in England. If milk production increases in England as well, then the ability of Scottish milk to be processed south of the border comes under pressure. This would suggest scope to increase processing capacity in Scotland. However, this requires certainty that demand will remain long-term and will not dissipate due to trade deals that the UK completes elsewhere, be that New Zealand, the US or even the EU.

Figure 6-1: Projected Scottish Milk Output (£m) & Production (Million Litres) by Brexit Scenario



Sources: Andersons and Wageningen University and Research (WUR)

6.6 IMPLICATIONS FOR SCOTTISH DAIRY FARMING

Table 6-6 summarises the projected farm-level impacts of both Brexit scenarios, using averaged data on dairying from the Scottish FBI publication. Milk output has been separated out from other livestock output (which is dominated by cattle). Only the Brexit-related impacts concerning trade and input costs have been modelled, support remains the same. Looking at dairy products overall, the UK is not self-sufficient. This means that the imposition of trade barriers leads to slight price increases (+0.4%) at the farmgate. Variable costs, especially imported inputs, veterinary and medical (and casual labour) rise due to the combination of border frictions and the ending of Free Movement. Fixed costs, particularly regular labour also rise. However, on the whole the agricultural production margin rises by 2.3% and when support (unchanged in both scenarios) is factored in, the overall business surplus increases by 1%.

The No Deal scenario, with the imposition of the UKGT schedule, sees a protected UK market where prices for milk (and beef) can rise. The farmgate milk price increase (9.4%) combined with the significant increases in cattle prices (see Chapter 7) mean that livestock output is up by over 10%. Variable costs decline marginally (-0.3%) due mainly to the decreased barley prices. This contributes to a 1% decline in feed costs generally as there are other feed ingredients also used and not all of the benefits of a price decline would be passed onto farmers. Elsewhere, veterinary and medical costs rise by 8% due to greater demand on veterinary services for sanitary and phytosanitary tasks.

Despite some cost increases, margin from production nearly triples meaning that the overall business surplus is projected to rise by over 75%.

Table 6-6: Projected Impact of Brexit Scenarios on Scottish Dairy Farms

Parameter	18/19 (Base)	FTA	% Ch.	No Deal	% Ch.
Milk Output (excluding support)	563,838	505,881	0.4%	551,229	9.4%
Other Livestock Output (excl. support)	59,972	60,630	1.1%	69,835	16.4%
Total Livestock Output (excl. support)	623,811	566,511	0.5%	621,065	10.1%
Livestock-Specific Variable Costs	263,618	264,488	0.3%	262,808	-0.3%
Livestock-Specific Gross Margin	300,220	241,393	0.5%	288,421	20.1%
Total Agricultural Output	583,979	586,651	0.5%	640,660	9.7%
Total Agricultural Variable Costs	300,476	301,689	0.4%	300,771	0.1%
Total Agricultural Fixed Costs	252,344	253,098	0.3%	255,171	1.1%
Margin from Agricultural Production	31,159	31,864	2.3%	84,719	171.9%
Agricultural Support	39,572	39,572	0.0%	39,572	0.0%
Agricultural Business Surplus	70,731	71,435	1.0%	124,290	75.7%

Sources: Scottish Government (Scottish Farm Business Income (FBI) Publication) and Andersons

6.7 CONCLUDING REMARKS

In comparison with sheepmeat (see next Chapter), the impact of Brexit on Scottish dairying is likely to be more positive. Admittedly, relatively little change is forecast under the FTA scenario, but under a No Deal farm profitability could theoretically be boosted significantly. Added friction should support domestic prices, provided that key export markets for cheddar are safeguarded and that adequate processing capacity exists for increased milk volumes. This latter issue is crucial for Scotland as it does not have the capacity to process all of its milk.

As noted throughout this Chapter, if the UK strikes trade deals with the likes of New Zealand and substantial volumes of Irish dairy products continue to find their way into the GB market (provided they qualify under the NI Protocol), then then the farm-level gains would be dampened considerably.

7. BREXIT IMPACT – BEEF AND SHEEP

7.1 TARIFF IMPACTS

7.1.1 UK Imports

The percentage impact of the UK’s Global Tariff (GT) on imports of the top-five beef and sheepmeat products from the EU and non-EU regions are shown in Table 7-1. In general, it shows the import tariffs have a greater percentage effect on imports from the EU27 than from non-EU. This is primarily because prices for EU imports tend to be lower. Take for example, fresh/chilled boneless beef. The AVE for EU imports is 66%, which is 18 percentage points higher than non-EU. The price per tonne of EU imports (£4,649) is lower than for non-EU (£7,108) so when the fixed component of the UK tariff (£2,530/t) is applied, it has a smaller impact on the higher value products.

Similar trends are also evident across other beef and lamb products and illustrates that imports from the EU will be disadvantaged if tariffs become applicable. For some products (e.g. chilled beef and lamb carcasses), imports do not come in from non-EU countries, partly due to the distances involved which make it more economical to import value added products which contain less waste (e.g. unwanted bone, fat trimmings etc.) whilst also bearing in mind the influence of TRQs (see next section).

Table 7-1 – Impact of UK Tariffs (in AVE terms) on Imported Trade for Selected Commodities

HS Code	Description	EU		Non-EU*	
		£/t	AVE%	£/t	AVE %
02011000	Chilled beef carcasses or half-carcasses	3,192	58%	n/a	n/a
02012090	Chilled beef cuts, with bone in	6,009	49%	18,809	24%
02013000	Chilled boneless beef	4,649	66%	7,108	48%
02023010	Frozen beef boneless forequarters, whole or cut	1,545	132%	4,044	58%
02023090	Frozen beef boneless meat (excl. forequarters)	3,346	88%	4,081	74%
02041000	Chilled lamb carcasses and half-carcasses	3,186	57%	n/a	n/a
02042250	Chilled sheep legs	6,562	15%	5,784	15%
02042300	Chilled boneless cuts of sheep	3,105	20%	7,000	16%
02044250	Frozen sheep legs	4,452	43%	4,652	42%
02044310	Frozen meat of lambs, boneless, frozen	2,849	81%	3,905	62%

Sources: HMRC and The Andersons Centre (2020)

* Refers to all non-EU countries on aggregate.

Note: AVEs have been calculated based on 2017-2019 average price per unit values.

n/a: refers to insufficient trade taking place for the commodity code during 2017-19 to give a tariff value.

7.1.2 UK Exports

Table 7-2 shows that for UK and Scottish exports, the impact of the EU CET would be substantial, and is estimated at 67% for chilled boneless beef and 87% for chilled beef carcasses. The fact that export prices for these products are significantly lower than the corresponding import prices shown in Table 7-1 above is the key reason for the higher AVE impact. This is because the EU CET includes both a percentage component (12.8%) and a fixed component, which ranges from between €1,768 to €3,041 per tonne across the commodities selected, which results in a much higher AVE tariff for lower-priced products.

For sheepmeat, the AVE tariffs are lower than for beef (as prices are higher) but still range from 44% to 63%. This would render Scottish exports of lamb uncompetitive in a No Deal scenario. Given that exports to the EU represent over 31% of UK lamb output (see Table 4-3), it is evident why participants in the Scottish sheepmeat sector are gravely concerned about what would happen under a No Deal scenario.

Table 7-2 – Impact of EU Common External Tariff (in AVE terms) on UK Exports

HS Code	Description	Price £/t	AVE %
02011000	Chilled beef carcasses or half-carcasses	2,120	87%
02012090	Chilled beef cuts, with bone in	3,803	75%
02013000	Chilled boneless beef	5,000	67%
02023010	Frozen beef boneless forequarters, whole or cut	799	259%
02023090	Frozen beef boneless meat (excl. forequarters)	2,875	107%
02041000	Chilled lamb carcasses and half-carcasses	4,179	49%
02042250	Chilled sheep legs	6,246	45%
02042300	Chilled boneless cuts of sheep	5,561	63%
02044250	Frozen sheep legs	4,740	44%
02044310	Frozen meat of lambs, boneless, frozen	4,466	60%

Sources: HMRC and The Andersons Centre (2020)

Note: AVEs have been calculated based on 2017-2019 average price per unit values.

n/a: refers to insufficient trade taking place for the commodity code during 2017-19 to give a tariff value.

7.2 TRQ IMPACTS

In this section, the focus is on existing beef and sheep meat TRQs that the UK was party to when it was an EU Member State. Section 7.5 provides an analysis of the impact of new TRQs for beef which the UK could potentially introduce in the future.

When the UK was part of the EU, there were approximately 186,904 tonnes available via WTO-notified TRQs for beef and associated edible beef offal (this excludes FTA TRQs such as the recent 50,000t hormone-free TRQ that the EU negotiated with Canada under CETA). Some of these are allocated to individual countries (e.g. Australia) or groups of countries (e.g. 11,500 tonnes of 'Hilton' beef quota available to the US and Canada). Based on the proposed splitting of the EU28 TRQs between the UK and the EU27 in December 2018²³, approximately two-thirds were allocated to the EU27 (124,373t) and one-third to the UK (62,531t). Of these amounts, Table 7-3 shows there would be just 64,280 tonnes which the UK could potentially access to export to the EU27 under a No Deal scenario. However, there would be limitations in terms of the types of beef (e.g. frozen) and the types of cuts/products (e.g. thin skirt) which could be potentially exported from the UK to the EU27.

Based on the conditions laid out under EU Commission regulations, beef exported to the EU under TRQs would have to be frozen, and a significant proportion (19,748 tonnes) would have to be used for processing. In recent times, just over 18,400 tonnes of UK beef are exported to the EU as frozen product, the majority (circa 60%) is exported as fresh/chilled beef and veal. This implies a reorientation towards frozen exports for processing. It would exclude the UK from high-end markets such as Italy and France where fresh/chilled trade is more prevalent. In such instances, it is likely that these previously exported tonnages would be used domestically to substitute imports coming from the Irish Republic for example.

In assessing potential for future market access under TRQs, as well as size of TRQ and in quota tariff, there are other terms and conditions which also need attention. For example, the method of allocation is important as TRQs can be administered in different ways. In the EU, TRQs tend to be set for an annual period (e.g. having a July-June year period or an April-March year period). From there, applications for licenses tend to be open to eligible applicants each quarter on a first-come-first-served basis. To be eligible for TRQs, applicants' plants must be EC-approved and are also required to have been active in the production of processed products containing beef throughout the 12-month period prior to application and the 12 months prior to that. They can only apply in the EU Member State in which they

are VAT registered and are required to lodge a security (€6/100kg) which would be forfeited if their TRQ allocations are not used. Each application must not exceed 10% of each quantity available and meat brought in under the TRQ must be processed within 3 months of import at a designated establishment. These rules would curtail the extent to which Scottish businesses could trade freely with the EU, in comparison with the status quo and it would require a greater planning of production activities throughout the year. Scottish processors would also need to pay close attention to ensuring that all administration relating to TRQs is undertaken diligently, because a loss of TRQ allocations due to administrative errors could have a major bearing on operations.

Table 7-3 – Comparison of EU Beef Products TRQs Available to UK versus UK Exports to EU

Product / Quota	Commission Regulation	Order No.	Total TRQ Tonnage (EU28)	EU27 Share (Available to UK)	UK Share (Available to EU)	UK Exports to EU	Duty / Tariff
Frozen beef for processing	412/2008	09.4057	50,000	15,500	34,500	18,406*	20%
		09.4058	13,703	4,248	9,455		20% + specific duty
Frozen beef (GATT)	431/2008	09.4003	54,875	43,732	11,143		20%
Frozen thin skirt ('hampe')	748/2008	09.4020	800	800	0	207~	4%
Sub-Total	TRQ Available		119,378	64,280	55,098	16,834	
UK Fresh/chilled beef exports						78,325	
UK Other beef and beef offal exports						35,994	
UK Total UK beef product exports to EU						131,153	

Sources: The European Commission (2018) and The Andersons Centre (2020)

* This figure refers to total frozen beef exports to the EU27 per annum averaged over 2017-19.

~ Includes thick and thin skirt products (relates to 2016-18).

From a beef import perspective, the proposed divisions set-out in Table 7-3 would also mean that there would be 55,098t available to EU27 Member States such as Ireland, based on existing TRQs alone. In addition, there is also the possibility that the UK could announce a new beef TRQ similar to the ~230Kt (at a 0% tariff) it had announced in March 2019 in the event of a No Deal Brexit at that time. On that occasion, the TRQ was going to be made available on an ERGA OMNES basis (i.e. to both EU27 and non-EU countries). If another such TRQ were to be introduced, it would have major implications for the competitiveness of Scottish produce, particularly if it was accessible to the likes of Brazil.

It also needs to be emphasised that the provisions of the NI Protocol which would permit frictionless trade on the island of Ireland to continue could result in significant volumes of Irish cattle being brought into Northern Ireland for slaughter. Once processed, this product could be shipped to the GB market and qualify as UK produce, as it would have undergone significant transformation in the UK. This would give rise to the possibility of significant volumes of Irish beef entering the UK tariff-free via Northern Ireland as tariffs between Dublin and Holyhead (GB) would be prohibitive.

Table 7-4 sets out the proposed division of sheepmeat EU28 TRQs between the UK and the EU27. It suggests that only around 378t would be accessible for UK exporters to the EU (available on an 'Erga Omnes' or 'Other' basis). This is miniscule in comparison with current UK sheepmeat exports to the EU (circa 97Kt). Post-Brexit, sheepmeat imports via TRQs would still take place as the existing EU28 TRQs would be divided up between the proportion that the UK would take on and the proportion to be taken on by the EU27 (i.e. available to UK exporters) as Table 7-4 also illustrates. It shows that the existing

EU28 TRQs are to be allocated evenly between the UK (49%) and the EU (51%) meaning that up to 137,326t of sheepmeat could be imported into the UK from elsewhere post-Brexit, of which, New Zealand would have an 83% share.

Table 7-4 – Proposed Division of EU28 Sheepmeat Import TRQs between EU27 and UK

Description	Country	Order No.	EU28 (t)	EU27 (t)	EU27 Share (%)	UK (t)	UK Share (%)
Meat of sheep or goats, fresh, chilled or frozen	Argentina	09.2011	23,000	17,006	74%	5,994	26%
As above	Iceland	09.0790	600	349	58%	251	42%
As above	Bosnia & Herzegovina		850	410	48%	440	52%
As above	Australia	09.2012	19,186	3,837	20%	15,349	80%
As above	Chile	09.1922	3,000	2,628	88%	372	12%
As above	Greenland	09.0693	100	48	48%	52	52%
As above	New Zealand	09.2013	228,389	114,184	50%	114,205	50%
As above	Uruguay	09.2014	5,800	4,759	82%	1,041	18%
As above	Other	09.2015	200	200	100%	0	0%
As above	Erga Omnes	09.2016	200	178	89%	22	11%
	Total		281,325	143,599	51%	137,726	49%

Source: Council of the European Union (2018)

7.3 NTM IMPACTS

Drawing upon the methodological approach outlined in Chapter 2 and the accompanying detailed methodological assumptions underpinning the NTMs model (see Annex I), Table 7-5 sets-out the estimated NTMs costs in AVE terms for selected beef and sheepmeat products. Due to space constraints, these are set-out on a probabilistic basis only for beef and sheep products and additional information on checked load NTM AVEs is provided in Annex III. As with previous chapters, probability-based estimates are averaged out over 100 loads and takes account of physical check rates (10% under an FTA, similar to CETA and 15% under a No Deal for beef and sheepmeat products). A proportion of physically checked loads are also subject to sampling (5% in an FTA (0.5% of all loads) and 10% under No Deal (1.5% of all loads). Loads which are subject to sampling are also assumed to experience value deterioration, set at 5% under an FTA and 20% under No Deal.

Under an FTA, assumed here to be a trade deal similar to CETA, the NTM estimates presented in Table 7-5 are much lower (ranging from 0.7% to 7.6% on UK exports to the EU) than those applying under a No Deal (1.3% to 12.2%). This is because for key regulatory checks (e.g. physical checks under the auspices of Defra), the check rates under a comprehensive FTA (e.g. 10% for beef) are significantly lower than those applying under a No Deal (assumed to be 15%). This, in turn, influences the number of shipments which are subject to sampling and the value deterioration resulting from delays which are significantly higher under a No Deal.

The results suggest that for most products, the estimated NTM costs are lower than those which have been assumed in previous studies (e.g. 5% under an FTA and 8% under a No Deal by van Berkum et al. (2016). This also reflects primary research feedback obtained during this study which suggests that although NTM costs remain a significant concern, they are not deemed to be as problematic as a few years' back. Of significance here is the fact that the physical check rate for red-meat under a No Deal

scenario has decreased from 20% to 15% based on EU Commission guidance²⁶. It also appears that companies are getting a greater understanding of the requirements involved in the past year or so and whilst sampling can cause significant delays, they would only affect a minority of loads.

That said, if a load is selected for the full range of regulatory checks including sampling, the estimated NTM costs can become substantial on chilled meat products and would surpass 25% in most instances under a No Deal scenario (see Annex III). This creates a disproportionate impact on SMEs because of they are likely to export fewer shipments and are less likely to be Authorised Economic Operators (AEOs) which can help in making some of the customs-related regulatory procedures less onerous.

Whilst the NTM costs provided below have been given on a weighted basis, it was decided that for a No Deal scenario, due to the tariffs imposed, any beef that might be traded between the UK and the EU27 which does not avail of a TRQ, is likely to be in carcase (or half-carcase) form. Accordingly, under a No Deal, the assumed NTMs costs for imports from the EU27 is 2.2% for both beef and lamb (RoRo). For exports to the EU27, NTM AVEs of 3.1% and 1.8% are assumed for beef and sheepmeat respectively.

Table 7-5: NTM AVEs for Selected Beef and Sheep Products for UK-EU Trade (Probability-Based)

HS Code	Description	UK Imports from EU27		UK Exports to EU27	
		FTA	No Deal	FTA	No Deal
02011000	Chilled beef carcasses or half-carcasses (LoLo)	2.0%	3.4%	2.9%	5.0%
02011000	Chilled beef carcasses or half-carcasses (RoRo)	1.2%	2.2%	1.7%	3.1%
02012090	Chilled beef cuts, with bone in (LoLo)	1.1%	2.0%	1.6%	2.9%
02012090	Chilled beef cuts, with bone in (RoRo)	0.7%	1.4%	1.0%	1.9%
02013000	Chilled boneless beef (LoLo)	1.4%	2.5%	1.3%	2.3%
02013000	Chilled boneless beef (RoRo)	0.8%	1.5%	0.7%	1.4%
02023010	Frozen beef boneless forequarters (LoLo)	4.0%	6.4%	7.6%	12.2%
02023010	Frozen beef boneless forequarters (RoRo)	2.3%	3.8%	4.4%	7.3%
02023090	Frozen boneless beef (excl. forequarters) (LoLo)	1.9%	3.1%	2.2%	3.6%
02023090	Frozen boneless beef (excl. forequarters) (LoLo)	1.1%	1.8%	1.3%	2.1%
	Beef Weighted (RoRo only)	1.1%	1.9%	1.2%	2.2%
02041000	Chilled lamb carcasses and half-carcasses (LoLo)	2.0%	3.4%	1.5%	2.7%
02041000	Chilled lamb carcasses and half-carcasses (RoRo)	1.2%	2.2%	0.9%	1.8%
02042250	Chilled sheep legs (LoLo)	1.1%	2.2%	1.2%	2.3%
02042250	Chilled sheep legs (RoRo)	0.7%	1.5%	0.8%	1.6%
02042300	Chilled boneless cuts of sheep (LoLo)	2.0%	3.5%	1.2%	2.1%
02042300	Chilled boneless cuts of sheep (RoRo)	1.2%	2.2%	0.7%	1.4%
02044250	Frozen sheep legs (LoLo)	1.4%	2.3%	1.3%	2.2%
02044250	Frozen sheep legs (RoRo)	0.8%	1.4%	0.8%	1.3%
02044310	Frozen meat of lambs, boneless, frozen (LoLo)	2.2%	3.5%	1.4%	2.3%
02044310	Frozen meat of lambs, boneless, frozen (RoRo)	1.3%	2.1%	0.8%	1.4%
	Lamb Weighted (RoRo only)	1.1%	2.0%	0.9%	1.7%

Source: The Andersons Centre (2020)

Note: Corresponding NTM AVEs on a Checked Load Basis are presented in Annex III.

7.4 LABOUR

As outlined in Section 3.4 (and Annex II), the usage of migrant labour in the Scottish red meat processing sector is substantial. With over half of the unskilled workforce consisting of migrants and with Free Movement soon ending, there is significant concern amongst industry participants that it will become

more difficult to source employees in future. That said, there was an acknowledgement amongst some interviewees that a significant proportion of the 40-45% of migrant workers in the beef and sheep processing sectors would be eligible for Settled Status. However, there was also acceptance that the meat processing sector is less attractive to work in than most other sectors. Therefore, staff turnover is higher resulting in a greater need to source new recruits.

At the time of the interviews there was also concern that the salary thresholds advised by the Migration Advisory Committee (MAC) for the UK’s post-Brexit immigration system. However, these concerns have been addressed to some degree with the MAC’s recent suggestion that butchers should be added to the UK-wide Shortage Occupation List²⁸. That said, there are other roles within abattoirs (e.g. lairage operators) where it will remain challenging to recruit migrant workers. There were also concerns with sourcing veterinarians although industry participants recognised the work that the Scottish Government and Food Standards Scotland (FSS) are doing on this (e.g. getting more private sector involvement).

Overall, it would appear that whilst some key concerns are being addressed, labour issues will continue to feature prominently post-Brexit. Although some processors have had some success with introducing apprenticeship schemes (e.g. for butchers), these continue to be considered marginal. That said, there was a consensus that more needed to be done to recruit indigenously. Accessing migrant labour is not thought to be that problematic at farm level but could be a challenge in individual cases²⁹.

7.5 EFFECTS ON UK AND SCOTTISH OUTPUT AND TRADE

The results presented in Table 7-6 show the projected short-run and long-term Brexit impacts at a UK level by scenario for beef and sheepmeat with further discussion in the sections underneath. As sensitivity analysis was requested on potential TRQs for beef, an additional scenario has been added. The ‘Core’ No Deal scenario assumes that 196Kt of a new UK TRQ would be made available to importers on an ‘Erga Omnes’ basis. This figure was based on the UK’s net trade for beef with the EU27 during 2017-19. The sensitivity scenario is based on the new TRQ halving to 98Kt to determine the extent to which a changed TRQ would impact output and trade.

Table 7-6: Projected Brexit Impacts by Scenario on UK Beef and Sheepmeat (% Change vs Base)

Commodity and Parameter	2017-19 Baseline	FTA 2021	FTA 2025	‘Core’ No Deal 2021*	‘Core’ No Deal 2025*	No Deal 2021 (98Kt) TRQ^	No Deal 2025 (98Kt) TRQ^
Beef							
UK Production (£m)	2,899	1.1%	1.3%	16.9%	18.8%	20.7%	23.2%
UK Production (Kt)	907	0.0%	0.2%	-0.2%	3.4%	-0.3%	3.7%
UK Consumption (Kt)	1,103	0.0%	0.0%	-1.2%	-1.0%	-1.3%	-1.1%
Price (£/t)	3,195	1.1%	1.1%	17.2%	14.9%	21.1%	18.8%
Exports (Kt)	147	0.0%	0.6%	7.6%	11.3%	7.6%	13.1%
Imports (Kt)	342	0.0%	-0.2%	-1.4%	-7.0%	-1.4%	-7.8%
Sheepmeat							
UK Production (£m)	1,240	1.0%	1.2%	-28.5%	-35.8%	N/A	N/A
UK Production (Kt)	308	0.0%	0.3%	-1.8%	-12.9%		
UK Consumption (Kt)	299	0.9%	1.0%	36.5%	35.2%		
Prices (£/t)	4,021	1.0%	0.9%	-27.2%	-26.3%		
Exports (Kt)	102	-0.9%	-0.4%	-24.4%	-45.6%		
Imports (Kt)	92	0.0%	-2.1%	37.6%	8.3%		

Sources: The Andersons Centre and Wageningen University and Research (WUR)

*Assumes a 196Kt TRQ is available for beef to all importers (Erga Omnes basis) which approximates the net trade position 2017-19.

^ Additional sensitivity analysis scenario which assumes that new UK TRQ is half the ‘Core’ No Deal scenario.

7.5.1 Beef

Similar to previous studies, the projected impacts on beef and sheepmeat output and trade under a Brexit Deal scenario are projected to be relatively minor as depicted in Table 7-6.

FTA Scenario

- **Domestic production:** monetary value of production rises by 1.1% in the short-term and by 1.3% in 2025 vis-à-vis the Baseline. This is chiefly driven by higher domestic prices as production quantity changes minimally in the short-run and a slight (0.2%) rise is projected in 2025. The main driver of this change is the imposition of NTMs on imports from the EU, making them slightly less competitive. As the NTM AVEs compiled during this study are smaller than previous studies' estimates, the output increases have not been as significant.

Of course, there are key caveats to be aware of when interpreting these results. Firstly, NTMs have been estimated on the basis that the UK's standards remain the same as the EU's. Divergences in standards would increase NTM costs as more border checks would be needed. Secondly, the FTA scenario does not consider additional FTAs that the UK might agree with other countries (e.g. US, Australia). As prices tend to be lower in these countries, their increased participation in the UK market will lower prices for domestic producers thus eroding any gains under an FTA scenario.

- **Consumption:** minimal changes are projected as trade with the EU can largely continue. Price changes may have some marginal effects on consumption, however, this will also be contingent on relative price changes in other meat products (notably pork and poultry). As NTM costs tend to be higher in AVE terms for these commodities, the effects of such substitution in the FTA scenario are not anticipated.
- **Prices:** small increases of just over 1% are forecast and mainly due to NTMs as outlined above.
- **Exports:** a slight increase is forecast long-term and this is driven by increases in dairy output, meaning more dairy-beef. Increased domestic production is also likely to lead to increased exports of lower-value products (fifth-quarter, offal etc.).
- **Imports:** down very slightly (-0.2%) due to NTMs making them more expensive. But it is a minimal change overall.
- **Short-term impacts:** due to the configuration of Agmemod, it has not been possible to model potential disruptions to trade which might occur in the first few weeks and months of the Transition Period ending. This could involve delays at the border driving up NTM costs. Whilst some delays have been envisaged in calculating the NTM AVEs shown above, provision for more exception delays (e.g. long queues en-route to Dover) have not been formally estimated. That said, Annex III gives information on the projected NTM costs of a load subject to the full range of regulatory checks and associated delays. If similar delays take place in early 2021, then potential NTM costs could rise to the region of 8-11% for beef. This would have a severe negative impact on exports which are particularly important for the Scottish beef processing industry.

No Deal Scenarios

The comments below primarily relate to the 'Core' No Deal, however where the Sensitivity TRQ scenario is commented on, it is highlighted in *italics*.

- **Domestic production:** relatively small changes are projected in 2021 and this is due to the nature of beef production as the animals being slaughtered in 2021 were largely born in 2019/20. Longer term, an increase of 3.7% is projected. This is driven by a few factors. Firstly, specialised beef producers react to the higher prices. The expansion of dairy production discussed in Chapter 6 means that there will be more dairy beef available. As the UK is a net beef importer and the new

UK TRQ assumed under the No Deal scenario (196Kt) covers net trade, NTM costs still apply, this should help the competitive position of UK producers, unless import prices are significantly lower.

Under the Sensitivity No Deal scenario, the production increase is only marginally higher, as the slight additional increase under this scenario (versus Core No Deal), induces some additional domestic production. However, these projected increases are based on UK's existing trading arrangements with non-EU countries remaining largely the same. As noted above, the impact of FTAs that the UK undertakes with other countries will have a major influence on future British beef output. Increased market access for third countries will erode, and likely reverse, any gains that UK producers might make under a No Deal where trade barriers make imports from the EU more expensive.

Another complicating factor is the impact of the NI Protocol as it might mean that additional volumes of live cattle will be shipped from the Republic of Ireland to Northern Ireland for slaughter. This meat could then potentially 'qualify' for unfettered access to the UK market. This would mean that more Irish beef would find its way into the UK and being classified as UK production. This issue is anticipated to feature prominently if Irish beef exports have difficulty in accessing the UK market via any new TRQ that is introduced (i.e. other third countries have more competitive prices and out-compete Irish producers). *There would arguably be more pressure for this to occur under the Sensitivity No Deal scenario as there would be less TRQ to access the UK (GB) market directly.*

- **Prices:** with the UK being a net importer and barriers on EU imports, prices are projected to rise substantially. Short-term, a 17.2% rise is projected and although this diminishes somewhat longer-term, prices in 2025 would still be 14.9% above the baseline. However, as noted above, these price increases will be reversed if the UK completes FTAs with third countries where prices (and standards) are much lower. *Prices increase further in the Sensitivity scenario, up by over 21% in the short-term and in 2025, prices are projected to be 18.8% ahead of the Baseline. This reflects reduced supplies of cheaper overseas beef on the UK market.*
- **Exports:** are forecast to rise by 7.6% in the short-term and by 11.3% in 2025. Longer term, as dairy production expands, more cows will be slaughtered and as consumption is limited in the UK, overseas markets will need to be found. Also, any expansion in domestic UK production will mean that there are parts of the carcass not consumed in the UK and would also be available for export, most likely in non-EU markets due to the CET and limited availability of TRQs. *This is a contributory factor as to why long-term exports are forecast to rise by over 13% in the Sensitivity No Deal scenario.*
- **Imports:** imports are forecast to fall as they get substituted by expanded domestic production, despite a 196Kt TRQ applying. This is primarily anticipated to occur on imports from the EU. *Although Agmemod does not report the split of imports between the EU and non-EU, it is conceivable that under the Sensitivity No Deal scenario, that imports from the EU would be further curtailed as they would not be competitive if tariffs were imposed. However, some imports from Latin America might be competitive, even with a tariff, but this would be contingent on these products meeting the UK standards.*
- **Short-term impacts:** as discussed previously in the FTA scenario, short-term delays in the weeks after the Transition Period ending have not been factored into consideration for the Agmemod analysis. These arguably could be even more pronounced under a No Deal as the imposition of regulatory checks on trade would be greater. This would result in more delays and more danger of value deterioration. As Annex III illustrates, NTM AVEs for beef loads subject to the full range of regulatory checks would surpass 25%. This coupled with tariffs would kill-off exports to the EU.

7.5.2 Sheepmeat

FTA Scenario

- **Domestic production:** as Chapter 4 has shown, sheepmeat production is much more reliant on exports to the EU market than beef. Under the FTA scenario, minimal changes are forecast to production volumes in the short-term and a small rise is projected long-term, driven mainly by import substitution and greater efforts to “Buy British”.
- **Prices:** are forecast to rise by approximately 1%. Here, the imposition of NTM costs on any imports from the EU has a (small) effect. The bigger influence is that NTM costs are also anticipated on products such as pork and poultry and this means some marginal increases in lamb prices. This, in turn helps to increase monetary value of output by 1.2% long-term.
- **Exports:** decline somewhat as NTMs on exports to the EU affect trade. However, a decline of under 1% is projected short-term and as time passes, a partial recovery takes place but exports would still be lower than the Baseline.
- **Imports:** minimal change in the short-term as most imports come from non-EU countries. Longer-term, a 2.1% decline occurs as import substitution takes place.
- **Short-term impacts:** as with beef above, any teething problems at the UK-EU border in early 2021 have not been accounted for in the Agmemod results as calculating such impacts is speculative. Again, Annex III contains estimates on checked load NTM AVEs for sheepmeat under an FTA scenario which are just over 8% for chilled lamb carcasses. If such costs were to be imposed on UK sheepmeat exports to the EU, then there would be a more pronounced decline in exports in 2021.
- **Overall:** the impacts under the FTA scenario are quite minimal and this mirrors primary research feedback. In comparison with interviews undertaken in previous studies, there appears to be a lowering of concerns around NTMs more generally and industry appears to be more accepting that these will need to be “taken on the chin” as a result of Brexit. That said, most industry participants, particularly in grazing livestock urged that Scottish/UK standards are not lowered as this would be to the detriment of both existing sales (within the UK and to the EU) as well as building new export markets.

No Deal

- **Domestic production:** a relatively small (1.8%) decline is projected in the short-run as a significant proportion of the lamb crop produced in 2021 would be planned in 2020. However, in 2025, a substantial 12.9% decline in production quantity is projected as exports to the EU, subject to tariffs, collapse and the EU27 is better positioned to expand its own domestic supply. This long-term decline is still low relative to the proportion of the lamb crop that is exported to the EU (circa 25-40% depending on the size of the UK lamb crop). This is because sheep are grazed on marginal lands with few alternative uses, making sheep production relatively price inelastic.
- **Prices:** given the UK’s reliance on export markets and the ability to engage in import substitution relatively limited, a short-term decline of 27.2% is projected and the situation only improves slightly in 2025 (26.3% decline) as the UK attempts to engage in some import substitution as well as compete with substitutes meats.
- **Domestic consumption:** is projected to rise by over 36% in the short-run as the UK lamb price collapses leading to an increased propensity amongst consumers to purchase it. Especially, as substitute products such as pork and poultry will have tariffs imposed on imports into the UK. Consumption also appears to hold-up longer term, forecast to be 35% above the Baseline in 2025.

- **Domestic output:** unsurprisingly falls in monetary terms given the impact on prices especially. Short-term declines of 28% deteriorate further to nearly 36% in 2025. This will result in vast swathes of the UK sheepmeat sector becoming uncompetitive. Some farms may focus on expanding beef production, whilst many others are likely to exit the industry.
- **Exports:** unsurprisingly diminish substantially with long-term , dropping by over 45%. Within this, exports to the EU will be devastated and whilst the UK would have a large excess supply which it will need to place onto world markets, at lower prices, exports overall will suffer major declines.
- **Imports:** curiously rise in volume terms in the short-run, however, this is likely to be a reaction by Agmemod to the substantial reductions in domestic prices. It is questionable whether, with so much domestic lamb available, that more imported lamb would be brought into the UK. Although the rise in imports versus the Baseline continues in 2025, it is much less pronounced (+8.3%).
- **Short-term impacts:** again, short-term delays in the weeks after the Transition Period ending have not been factored into consideration. As Annex III shows, NTM AVEs for sheepmeat subject to onerous delays would be in the region of 25%. For sheepmeat, these could conceivably become more pronounced than for beef given the UK's dependence on exports to the EU and finding new customers at short notice would be difficult, unless significant discounts were made. If this were then coupled with the Covid Crisis, where lockdowns mean that food service outlets were unavailable, then the impact could become even more severe.
- **Overall:** a No Deal would have major ramifications for the UK and Scottish sheepmeat sectors as significant swathes of farms would simply become unviable. Although sheep production has traditionally been price inelastic, a No Deal would force farmers to take a hard look at how their land is used. This could spur a further increase in tree-planting which has been rising consistently in Scotland in recent years.

7.5.3 Implications for Scottish Output

To give an indication of the projected impact of each Brexit scenario on Scottish beef and sheep meat production and monetary output, Figure 7-1 shows the effects of the projected changes to production if these were applied to Scottish output, using 2017-19 as a proxy.

The monetary value of beef output rises strongly under a No Deal to surpass £683 million in 2025 in comparison with the 2017-19 baseline (£575 million), a £108 million increase. Conversely, the value of sheepmeat output declines by £76 million long-term under No Deal to £137 million. Under the FTA scenario, slight increases are projected for both beef and sheepmeat, driven mainly by increased domestic consumption in the case of sheepmeat and by price increases for beef.

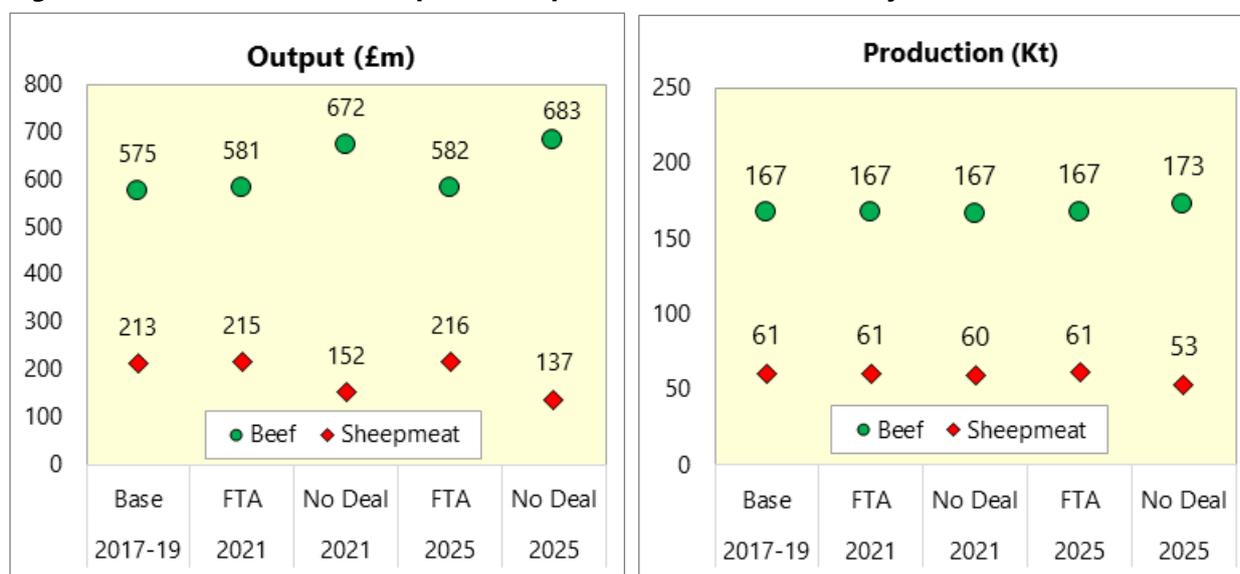
In tonnage terms, the projected changes mean that production remains relatively stable under the FTA scenario and in the short-term under a No Deal, as farmers have largely committed to producing the forthcoming beef and lamb crops. Longer-term, given the significant price decreases for sheepmeat, it is unsurprising that its production declines to 53Kt (from 61Kt) and for beef there is a corresponding 6Kt increase versus the 2017-19 Base.

On the face of it, the results look positive under a No Deal for beef but this scenario gives rise to major concerns for the viability of Scottish sheepmeat production. As highlighted above, any new FTAs that the UK strikes with other countries will severely erode any gains for the beef sector.

Furthermore, based on primary research input, there are also significant concerns around the impact of the ending of Free Movement will have on processing operations, where there is a strong reliance on migrant labour. Whilst most workers will be in a position to achieve Settled Status, there will be challenges in recruiting new workers. Getting skills such as butchery onto the Shortage Occupation List

has helped somewhat as has relaxing the salary thresholds. However, significant challenges remain and interviewees believe that the industry needs greater certainty on this issue which has become much more pressing for processors in recent months.

Figure 7-1: Scottish Beef & Sheepmeat Output & Production Effects by Scenario (2021-25)



Sources: The Andersons Centre and Wageningen University and Research (WUR)

7.6 IMPLICATIONS FOR SCOTTISH BEEF & SHEEP FARMING

Taking the price change projections from the Agmemod model in conjunction with additional assumptions derived from the primary research and previous studies, the impacts under both Brexit scenarios were assessed at the farm-level using information obtained from the Scottish Farm Business Income (FBI) annual estimates³⁰. Further detail on the assumptions used is set-out in Annex IV where additional farm-level analysis using Andersons’ Meadow Farm Model is also provided. As the latest year for the FBI is 2018/19, this has been used as the Base against which the Brexit impacts have been assessed. Sections 7.6.1 and 7.6.2 summarise the “before” and “after” results for Less-Favoured Area (LFA) and Lowland beef and sheep farms respectively. As the projections, taken to occur in the first full financial year after each scenario commences, simply look at the percentage changes vis-à-vis the Base.

7.6.1 Scottish LFA Beef and Sheep Farming

Table 7-7 summarises the projected farm-level impacts of each Brexit scenario for Scottish LFA Beef and Sheep farms and is followed by an overview of the key impacts associated with each scenario. It is estimated that there are around 14,900 LFA cattle and sheep holdings in Scotland, over five times the number of lowland cattle and sheep farms (2,850 holdings)³¹. Notably, the focus of this analysis is on agricultural output and associated activities (support receipts) only. It does not include other income from contracting and diversification activities which themselves are also likely to be subject to significant Brexit-related impacts (outside the scope of this study). Also, as the results are based on short-term projections, it does not consider any expansion of beef for instance of a decrease in sheep. Accordingly, the focus is on beef and sheep farming and associated agricultural activities (e.g. ancillary cereals enterprises). In terms of total agricultural output, there is an even split between cattle (47%) and sheep (46%) with the remaining 7% going to a range of other small-scale enterprises.

- Livestock output:** increases slightly in an FTA scenario driven by the price increases noted above arising from the imposition of NTMs. Under No Deal, overall livestock output is forecast to decline by 4.6% due to the proportionately larger influence of falling lamb prices which more

than offsets the cattle price increases. This reflects the exposure of many Scottish grazing livestock farms outside of the lowland areas, a trend that would be exacerbated if the UK adopts a more liberalised approach to imports from third countries.

- **Livestock variable costs:** rise slightly in the FTA scenario due to increased veterinary and medical costs (+5%) and casual labour (+4%) as previous studies and primary research suggest that availability will be curtailed once Free Movement ends and more veterinary staff are needed for border control tasks. Under No Deal, veterinary and casual labour costs increase further, by 15% and 8% respectively but the major factor behind the 0.7% decline across variable costs is the declining feed prices resulting from the price decreases for barley, noted in Chapter 5. Here, consideration was given to the balance of wheat (33%) and barley (67%) used in feed and it was assumed that half of any price drops would be passed on to farmers. Accordingly, feed and fodder prices are projected to fall by about 3%.
- **Livestock Gross Margin:** improves by 1.5% against the Base in the FTA scenario but declines by 9.9% under No Deal, due to the significant fall in lamb prices.
- **Total agricultural output:** reflects livestock trends as there is limited cropping on LFA farms.
- **Fixed Costs:** rise by just 0.2% in the FTA scenario, chiefly driven by a 2% increase in permanent labour, taken to be approximately half the rise in casual labour (as seasonal workers will be more of a premium due to shortages in horticulture). In No Deal, paid Labour is forecast to rise by 7.5%, again half the casual labour cost rise, due to restrictions on labour availability. However, as employed regular labour is not heavily utilised, overall fixed costs only rise by 0.8%.
- **Margin from Production:** reflecting the situation of many Scottish beef and sheep farms, this farm makes a production loss of over £46,300 in the Base period. A slight (0.8%) improvement is forecast under the FTA scenario but a 12.1% fall is projected under No Deal.
- **Support:** assumed to remain unchanged in both scenarios. However, the estimates in Table 7-7 show just how reliant LFA Beef and Sheep farms are on support and if this declined significantly, many would be placed in a perilous position.
- **Business Surplus:** increases by 1.7% under the FTA scenario. Under No Deal, a ~24% decline is projected. In an industry where production margins are already negative to a significant degree, any further losses would put many farmers under additional financial strain. Whilst LFA farms on the whole are projected to generate over £17,622 of a surplus under No Deal, this is only because of the support provided. It does not leave much scope for reinvestment in the business for the long-term or any long-term structural changes which would be required (e.g. switching from lamb to beef production) in the event of a No Deal.

Table 7-7: Projected Impact of Brexit Scenarios on LFA Scottish Beef & Sheep (£/Farm)

Parameter	18/19 (Base)	FTA	% Ch.	No Deal	% Ch.
Livestock Output (excluding support)	104,180	105,272	1.0%	99,338	-4.6%
Livestock-Specific Variable Costs	59,610	60,018	0.7%	59,179	-0.7%
Livestock-Specific Gross Margin	44,570	45,255	1.5%	40,160	-9.9%
Total Agricultural Output	112,024	113,114	1.0%	107,039	-4.4%
Total Agricultural Variable Costs	70,811	71,323	0.7%	70,716	-0.1%
Total Agricultural Fixed Costs	87,602	87,795	0.2%	88,327	0.8%
Margin from Agricultural Production	-46,389	-46,004	+0.8%	-52,003	-12.1%
Agricultural Support	69,626	69,626	0.0%	69,626	0.0%
Agricultural Business Surplus	23,236	23,621	1.7%	17,622	-24.2%

Source: Scottish Farm Business Survey (2018/19)

7.6.2 Scottish Lowland Beef and Sheep Farming

As with LFA Beef and Sheep above, Table 7-8 depicts the projected Brexit impacts for Scottish lowland grazing livestock farms. Again, agricultural enterprises are the focus with contracting and diversification activities have been removed from the analysis. The assumptions underpinning the projected percentage changes under both scenarios are the same as those presented in the previous section. However, due to differences in enterprise mix and utilisation of resources, key differences emerge. On lowland farms, cattle production accounts for 60% of agricultural output. Sheep and wool has a relatively low (15%) share and is almost surpassed by barley (14%).

As with LFA farms, the impacts under an FTA scenario is relatively limited, with slight increases in output and variable costs leading to improved livestock gross margin of 2%. The margin from production is again negative, but to a much lesser degree than for LFA farms. However, support is also much lower meaning that the overall production margin stands at just under £10,000 in the base period. This improves by 5.6% to almost £10,100 in the FTA scenario.

Under No Deal, as cattle are relatively more important on lowland farms, their projected price increases have a much more positive impact on output, with an 8% increase projected. As variable costs decline by 1.5% again due to lower feed costs as described above, the resultant livestock gross margin is over 20% higher than the base. This contributes to a 24% improvement in the margin from production loss (to just under £18,100). Keeping support constant means that the agricultural business surplus (£15,231) improves by over 59%. As highlighted several times above, whilst the imposition of the UKGT on imports from the EU will assist domestic beef production, this will be severely eroded and reversed if the UK opens-up to imports from third countries. When coupled with severe lamb price declines, this would have a hugely damaging impact on Scottish farm incomes in the grazing livestock sector.

Table 7-8: Projected Impact of Brexit Scenarios on Lowland Scottish Beef & Sheep (£/Farm)

Parameter	18/19 (Base)	FTA	% Ch.	No Deal	% Ch.
Livestock Output (excluding support)	95,426	96,447	1.1%	103,068	8.0%
Livestock-Specific Variable Costs	54,170	54,371	0.4%	53,354	-1.5%
Livestock-Specific Gross Margin	41,256	42,076	2.0%	49,714	20.5%
Total Agricultural Output	126,083	127,098	0.8%	131,894	4.6%
Total Agricultural Variable Costs	73,167	73,558	0.5%	72,965	-0.3%
Total Agricultural Fixed Costs	76,668	76,760	0.1%	77,015	0.5%
Margin from Agricultural Production	-23,752	-23,220	+2.2%	-18,086	23.9%
Agricultural Support	33,318	33,318	0.0%	33,318	0.0%
Agricultural Business Surplus	9,566	10,098	5.6%	15,231	59.2%

Sources: Scottish Farm Business Survey, Andersons

7.7 CONCLUDING REMARKS

There are limited changes in the FTA scenario with scope for slight increases in output as NTMs affect EU imports. The prospects for beef and sheep enterprises are divergent under No Deal. However, the extent to which the beef sector will realise any gains will be predicated on the UK continuing to support the sector with respect to trade policy. This means that long-term, Scottish farmers would not be further exposed to overseas imports, particularly from non-EU. There is a danger that in the immediate aftermath of a No Deal that prices rise for beef, farmers then invest in new buildings etc. and having these investments are undermined by the opening UK to overseas competition.

The prospects to sheep under No Deal are alarming and would have grave consequences for the viability of many Scottish farms, with obvious implications for the processing sector and the wider Scottish rural economy, particularly in the uplands and highlands.

Given the potential trajectory of UK trade policy new FTAs are likely to be signed with non-EU countries (such FTAs were not within the scope of this study). Any gains for the beef sector arising from No Deal are highly uncertain and likely to be eroded as time progresses. This coupled with devastating impacts on sheep production would suggest that an FTA with the EU and continued adherence to the high food safety, animal welfare, environmental and labour standards within Scotland, and the UK generally, would put the sector on a firmer long-term footing for both farming and the wider rural economy.

8. BREXIT IMPACT – HORTICULTURE

8.1 TARIFF IMPACTS

Sections 8.1.1 and 8.1.2 set-out the estimated tariffs applicable on UK imports and exports respectively.

8.1.1 UK Imports

Table 8-1 shows that tariffs for horticultural products are much lower than for products of animal origin. The tariff for unprocessed potatoes is 10% when imported from July to December. This is slightly higher than the tariff for new potatoes (8%) so that the competitive position of UK potatoes is safeguarded. For seed potatoes, the UKGT is set at 4%. Industry experts did not view the imposition of tariffs as a major issue but did caution that, as margins are wafer thin in the potatoes’ sector, anything that increases costs is likely to have an inflationary effect at the consumer level. One contributor also acknowledged that the imposition of tariffs on processing potato imports from Belgium would assist UK processors. During 2017-19, uncooked frozen potato imports from the EU were estimated at £135 million, and these would incur a 16% import tariff. However, this would also add costs as significant investments in the UK’s processing capacity would be required. Either way, higher costs would increase consumer prices.

Due to HMRC data constraints, the prices in Table 8-1 for cauliflower and broccoli are combined prices. In reality, primary research input suggests that the prices for broccoli tend to be higher. In any case, the UKGT is set at 8%. Again, this would have an inflationary effect on imports from the EU in a No Deal Brexit which in addition to consumer price rises, is also likely to improve British producers’ competitiveness. That said, imports will still be important as broccoli in particular is a seasonal crop.

A No Deal scenario would also result in 10% tariffs being applied to strawberry imports from the EU from 2021. Again, this would have inflationary effects on consumer prices. Whilst this will help to improve British growers’ competitive position, they will only benefit if seasonal labour is available. Labour is by far the greatest issue in UK horticulture and is examined in more detail in Section 8.6 below.

Table 8-1: Estimated Tariffs for UK Imports of Horticultural Products – 2017-19 (AVE%)

HS Code	Description	EU		Non-EU	
		Price £/t	AVE%	Price £/t	AVE %
07011000	Seed potatoes	760	4.0%	645	4.0%
07019010	Potatoes for manufacture of starch, fresh or chilled	448	4.0%	N/A	
07019050	Fresh/chilled new potatoes from 1 Jan to 30 June	760	8.0%	408	8.0%
07019090	Potatoes, fresh or chilled (excl. new potatoes, seed potatoes and potatoes for manufacture of starch)	557	10.0%	376	10.0%
07041000	Fresh or chilled cauliflowers and headed broccoli	1,082	8.0%	3,148	8.0%
08101000	Fresh strawberries	2,999	10.0%	3,402	10.0%
20041099	Frozen processed potato products (uncooked)	857	16.0%	1,422	16.0%

Sources: HMRC and Andersons

8.1.2 UK Exports

As Table 4-2 shows, exports of strawberries, cauliflower and broccoli account for a small proportion of UK output, and Scottish output (see Table 4-5). Exports to the EU would deteriorate further under a No Deal as tariffs of 11.2% and 10.4% would be applied to strawberry and cauliflower/broccoli respectively.

However, tariffs would be more of an issue for potatoes, particularly seed potatoes, where significant exports take place from Scotland to the EU and its affiliated territories (e.g. Canary Islands). Admittedly,

the CET for seed potatoes (4.5%) is relatively low, but coupled with non-tariff measures (see Section 8.3), they would erode Scottish producers' competitive position, exerting a downward pressure on prices.

The tariffs for other unprocessed potatoes would range from 5.8% to 11.5%. Exports from the UK do take place into Europe, particularly when the Benelux processing sector is in deficit. As with malt, these exports tend to be more prevalent in East Anglia given its proximity to the Continent. However, opportunistic exports can take place from Scotland when there is an excess supply. Tariffs on processed potatoes to the EU (17.6% for uncooked frozen potatoes) would be more problematic. This would negatively impact trade with the EU which during 2017-19 averaged at £25.7 million per annum.

Although tariffs are not necessarily prohibitive (exchange rate swings have often been >15%), Scottish (and UK) producers' competitiveness would be eroded, thus impinging upon farm-level profitability.

Table 8-2: Estimated Tariffs on UK Horticultural Exports to the EU27 – 2017-19 (AVE %)

HS Code	Description	Price £/t	AVE %
07011000	Seed potatoes	423	4.5%
07019010	Potatoes for manufacture of starch, fresh or chilled	627	5.8%
07019050	Fresh or chilled new potatoes from 1 January to 30 June	415	9.6%
07019090	Potatoes, fresh or chilled (excl. new potatoes from 1 January to 30 June, seed potatoes and potatoes for manufacture of starch)	329	11.5%
07041000	Fresh or chilled cauliflowers and headed broccoli	1,202	10.4%
08101000	Fresh strawberries	1,465	11.2%
20041099	Frozen processed potato products (uncooked)	1,075	17.6%

Sources: HMRC and Andersons

8.2 TRQ IMPACTS

There are several EU28 TRQs for horticultural products such as sweet potatoes, garlic, top-fruit and citrus fruit. However, just one TRQ is relevant to the horticultural products examined in this study. This concerns fresh/chilled potatoes accessible to all WTO members on an Erga Omnes basis. As Table 8-3 shows virtually all of the 4,295t TRQ is allocated to the EU, thus having a minimal impact on the UK.

Table 8-3: Proposed Division of Selected EU28 Potatoes' Import TRQs between EU27 and UK

Description	Country	Order No.	EU28 (t)	EU27 (t)	EU27 Share (%)	UK (t)	UK Share (%)
Potatoes (fresh)	Erga Omnes	90055	4,295	4,292	99.9%	3	0.1%

Source: Council of the European Union (2018), Andersons (2020)

8.3 NTM IMPACTS

The estimated NTM AVEs for selected horticultural products are set out in Table 8-4. As with other sectors, these are presented on a probability basis. Further background information is in Annex III.

During the primary research, greatest concern was expressed with regards to seed potatoes given the extent to which they are traded overseas from Scotland. Post-Transition, the estimated range of NTM AVEs for seed potatoes is between 2.1% and 7.1%. NTM AVEs are higher for UK exports to the EU27 because the price (£423/tonne) is significantly lower than the import equivalent (£760/tonne). For trade with the EU, NTM costs are lower for RoRo and this is due to higher terminal handling fees being imposed on LoLo freight when regulatory checks are being undertaken.

As pointed out previously, a key assumption underlying the primary research estimates presented is that the UK regulations are assumed not to diverge from the EU post-EU exit, at least initially. During the primary research, some participants expressed concern at the potential impact of divergence,

especially if active ingredients (AIs) are no longer authorised in the EU but remain available in the UK. Some believe that this could pose a significant threat to sensitive export markets for seed potatoes (e.g. to Canary Islands or Spain), thus having a negative impact on trade.

An additional concern is according to one interviewee, as things stand recognition of the UK's third country status is not in place for exports to the EU, meaning that from 1st January, it will not be possible to export seed potatoes to the EU, a point substantiated by latest Government Guidance³². This is despite both UK growers and representatives from the European Potato Trade Association calling for continued mutual recognition (third country equivalence) for goods which have been harmonised for several years. Whilst unconfirmed by Defra, at the time of writing, it is believed based on primary research input that UK will permit imports of seed potatoes from the EU for six months if an equivalence agreement is not in place, based on the rationale that the standards of both parties are harmonised. Of course, imports would only come into England as imports do not come into Scotland based on a voluntary agreement amongst industry participants.

For ware potatoes, NTM AVE estimates range from 1.3% to 2.8% for RoRo, whilst for LoLo the AVEs are higher at 3.2% to 7.2%.

In a sector where seasonality is important for both export and import trade, the impact of NTMs particularly time delays could lead to some structural shifts. For instance, in recent years, the UK has exported to Belgium as its processing capacity has increased significantly. If increased delays are experienced on the Dover-Calais route for instance, this will make the viability of such trade problematic as the level of NTMs estimated below equate to a major proportion of profit margins.

Table 8-4: Estimated NTM Costs - Selected Horticultural Products for UK-EU Trade (AVE %)

HS Code	Description	UK Imports from EU27		UK Exports to EU27	
		FTA	No Deal	FTA	No Deal
07011000	Seed Potatoes (RoRo -26t)	2.1%	3.0%	3.7%	5.3%
04031091	Seed Potatoes (LoLo -26t)	3.1%	4.0%	5.6%	7.1%
07019090	Potatoes, fresh/chilled (excluding new) (RoRo)	1.3%	1.7%	2.1%	2.8%
07019090	Potatoes, fresh/chilled (excluding new) (LoLo)	3.2%	4.3%	5.3%	7.2%
07041000	Fresh cauliflower/broccoli (RoRo)	2.3%	3.2%	2.1%	2.9%
08101000	Fresh strawberries (RoRo)	0.4%	0.6%	0.8%	1.1%

Source: The Andersons Centre (2020)

For other horticultural produce, due to their highly perishable nature, only RoRo transport is assumed. For imports of cauliflower/broccoli from the EU, NTMs range from 2.3% to 3.2%. Whilst exports to the EU are small, some exports do take place from the UK to Ireland as well as opportunistic exports to other EU countries. Projected NTM AVEs for this trade range from 2.1% to 2.9%. Such costs would make a significant dent on profit margins.

The NTM AVEs for strawberries appear to be lower than for cauliflower/broccoli but that is a function of it being of a higher value. In comparison with labour concerns, most industry participants believe that NTM costs are a relatively minor issue for strawberries (see Section 8.6).

8.4 LABOUR

In comparison with other sectors, Scottish horticulture faces by far the most pressing challenges with labour arising from the end of Free Movement. Similar to previous studies, most notably the SRUC³³, the primary research feedback strongly suggests this challenge chiefly relates to sourcing seasonal workers. As Table 8-5 shows, there were over 9,250 migrant workers employed in Scottish horticulture

during 2017. The majority (72%) were employed in the protected soft fruit sector, where strawberries also feature, with potatoes (9%) also of significance. The survey found that numbers employed in the broccoli and cauliflower sectors were relatively small versus the industry generally. Obtaining reliable data on the employment of seasonal workers across the UK agriculture and horticulture is challenging. However, according to the analysis undertaken by Andersons in 2019, an estimated 75,000-90,000 seasonal migrant workers are employed in the UK each year. Therefore, Scottish horticulture accounts for 10-12% of this total.

Table 8-5: Estimated Number of Seasonal Workers in Scottish and UK Horticulture (2017)

Parameter	No. Workers	% Total
Protected Soft Fruit	6,694	72%
Field Fruits	631	7%
Strawberries, Raspberries and Blueberries	567	6%
Other Soft-Fruit (including Blackberries)	64	1%
Potatoes	810	9%
Flours and Bulbs	223	2%
Vegetables	899	10%
Calabrese (Broccoli)	216	2%
Cauliflower	39	0%
Other Vegetables (includes Rhubarb)	644	7%
Total Scottish Seasonal Migrant Workforce (Horticulture)	9,257	

Source: SRUC

Across all horticultural sectors assessed in this study, labour emerged as the principal concern. Whilst estimates of projected cost increases varied, there was a strong consensus that if Free Movement ended and there was an inadequate SAWS-replacement scheme (estimated at 70,000 workers across the UK), then seasonal labour costs would rise significantly. These averaged at 15% under the No Deal scenario, based on the opinions of industry participants, however, some interviewees thought that costs might rise by even more. To reflect this concern, a third scenario was added where labour costs increase by 20%, 5 percentage points higher than the 'core No Deal scenario (15% rise). As mentioned previously, it is worth re-emphasising that the labour arrangements are independent of whether there is a Deal or not, and could also become applicable under an FTA scenario, if SAWS was unavailable. Even with an expanded SAWS scheme of sufficient scale to meet most labour needs, some cost increases were anticipated to deal with extra administration costs and the like. These have been estimated in this study to be 4% under the FTA scenario. A further analysis of the impact of increased labour costs is provided in Section 8.6 below.

8.5 EFFECTS ON UK OUTPUT AND TRADE

Although potatoes are the only commodity in the horticultural sector which are covered by Agmemod, having consulted with Wageningen University on this, it was decided that the existing data within Agmemod are too weak to undertake a sufficiently robust analysis of changes to UK-EU trade. This is because, despite the UK input data being updated to 2019, the potatoes' sector has not been included within recent European Commission Market Outlook studies. Accordingly, the data across EU27 Member States have not been updated to the standard required, despite the best efforts of researchers working on this study. Therefore, for horticulture, the analyses presented below focus chiefly on the farm-level and combine insights from previous studies which Andersons and Wageningen University have been involved in as well as input from this study's primary research.

8.6 SCOTTISH FARM-LEVEL IMPLICATIONS

8.6.1 Seed Potatoes

Given the importance of seed potatoes in Scotland, Table 8-6 shows the projected impact of Brexit under each scenario. The farm-level data are primarily based on the Scottish Farm Management Handbook (2019/20)³⁴ for a high-performing seed potatoes enterprise. Casual labour costs from the ABC Book are used as these are not reported in the Farm Management Handbook. Further information is contained in Annex IV.

Table 8-6: Projected Brexit Impact Analysis - Scottish Seed Potatoes- High Performing (£ / Ha)

Parameter	19/20 (Base)	FTA		No Deal		No Deal (with 20% Labour Cost Increase)	
	£/Ha	£/Ha	% Ch.	£/Ha	% Ch.	£/Ha	% Ch.
Seed (25t/ha; £220/t)	6,650	6,527	-1.9%	6,341	-4.6%	6,341	-4.6%
Ware (6t/ha; £45/t)	270	272	0.6%	286	5.9%	286	5.9%
Stockfeed (2t/ha; £20/t)	40	40	0.0%	40	0.0%	40	0.0%
Output	6,960	6,839	-1.0%	6,667	-4.2%	6,667	-4.2%
Total Variable Costs^①	6,410	6,433	+0.4%	6,517	+1.7%	6,557	+2.3%
Gross Margin	551	406	-26.3%	149	-72.9%	110	-80.1%

Sources: Farm Management Handbook (2019/20), Agricultural Budgeting and Costing Book, Andersons

① Variable costs are primarily based on Scottish Farm Management Handbook, but as these do not include casual labour, costings from the Agricultural Budgeting Costing Book (90th edition) have been used to provide indication of Brexit impact.

Relatively small changes are forecast in the FTA scenario with seed potatoes' prices decreasing by approximately 1.9%, roughly half of the projected NTM costs on exports to the EU27 presented in Section 8.3. Ware prices increase slightly as imports from the EU27 are slightly less competitive whilst stockfeed prices are not assumed to change. Therefore, output is estimated to decline by 1%.

Total variable costs increase slightly (+0.4%). Within this, seed costs decline reflecting the decrease in seed potatoes' prices and labour is projected to rise by 4% due to increased regulatory requirements for bringing in migrant labour, which accounts for just over 12% of total variable costs in the Base case. This results in a 26.3% decline in gross margins under an FTA scenario.

Under a No Deal, gross margins decline considerably further. Seed potato prices incur a 4.6% price decline as a result of both tariff and NTM costs, whilst ware prices rise by 5.9%. Overall, output is projected to decline by 4.2%. Meanwhile variable costs are projected to rise driven chiefly by increased labour costs. For the horticultural sector, under a No Deal, casual labour costs were projected to rise by 15% on average. However, some input suggested that these cost increase could be even more pronounced. Accordingly, a No Deal scenario with a 20% casual labour cost increase was also estimated. Therefore, under the Core No Deal scenario, variable costs rise by 1.7%, and when a 20% casual labour cost increase is assumed, they rise by 2.3%.

This has a corrosive effect on gross margins which are projected to decline by 73-80% depending on the extent to which labour costs increase post-Brexit. As there was insufficient industry data on net profit margins and labour-related overheads, these have not been considered in the analysis below. However, primary research input suggests that whilst there are some migrant workers in the permanent workforce, most of them have been in Scotland for a long-time and would qualify for settled status. Accordingly, it is casual labour which is causing the greatest concern and this has arguably increased in

importance recently vis-à-vis tariffs and NTMs. This is because if labour is not available, businesses will not be able to operate. In this respect, the estimates provided below need to be treated with caution.

8.6.2 Cauliflower

Drawing upon input received during the primary research in conjunction with information from the 2019/20 Farm Management Handbook as well as insights from the Agricultural Budgeting and Costing (ABC) Book (90th edition)³⁵, the projected impacts of an FTA and a No Deal on a 'typical' cauliflower growing enterprise are presented in Table 8-7. As the Farm Management Handbook does not include estimates for casual labour, ABC Book estimates were used instead, and a gross margin was derived so that an indication of the impact of casual labour cost increases could be provided.

The projected changes are presented under three scenarios. The FTA and No Deal scenarios reflect the scenarios assessed throughout the report. To reflect the importance of potential changes in casual labour costs, a third scenario was added where labour costs increase by 20%, 5 percentage points higher than the 'core' No Deal scenario (15% rise). This reflects the balance of primary research input and insights from previous studies. The projected changes under the other cost sub-headings reflect primary research input and insights gained from previous studies. See Annex IV for more detail.

Under the FTA scenario, labour costs are projected to rise by 4% which reflects that whilst an augmented Seasonal Agricultural Workers Scheme (SAWS) might emerge, such labour will be more costly for several reasons. Based on primary research feedback, EU seasonal workers would be more likely to accept positions in Germany and Spain as they are closer to home and there are fewer exchange rate issues. The additional paperwork which is likely to accompany a new SAWS scheme would also be an impediment. Some interviewees also opined that of late, seasonal workers tend to be older, less well-educated and not as productive as in the past and that this trend would continue post-Brexit.

It is important to note that permanent labour is included within the overheads cost category. These are assumed to remain unchanged under both the FTA and No Deal scenarios. Whilst it is arguable that in some instances, competition for these workers will increase in the event of Free Movement ending, the primary research suggests that of the migrant workers employed in permanent positions, the vast majority would be able to gain "settled status". Staff turnover in these roles is also low. Taking account of this, and given that there was insufficient data to provide a realistic breakdown of the proportion of overheads costs accounted for by permanent labour, it was decided to leave this category unchanged.

Taking these points into consideration, Table 8-7 shows that variable costs are projected to increase by 4.6% under the FTA scenarios, driven mainly by casual labour. Whilst some price increases, estimated to be approximately half of the projected price increase in imports due to NTMs, would help to increase output by 1.6%, gross margins would decline by 2.5%. Assuming a Base net margin of 3%, projected net margins under an FTA would be 35% lower.

In a 'core' No Deal scenario, casual labour costs rise by 15% meaning that variable costs are 9.2% higher (up by £177/ha). In this scenario, prices are estimated to rise by 5.6%. Again, approximately half of the price-rise on imports associated with tariffs and NTM costs. This drives increased gross margins up by almost 1% whilst net margins are over 10% higher. Although this appears to imply that under a No Deal, profitability within the cauliflower sector would be significantly enhanced, the key caveat is that unless there is sufficient labour available, such profit increases will not be possible.

To demonstrate the extent to which the horticultural sector is exposed to risks around labour, projections were also provided assuming a 20% increase in casual labour costs whilst keeping all other costs the same as in the core No Deal scenario. Here, variable costs would rise by almost 12% wiping-out any increased revenue output. Net margins would decline by over 38%. In an industry where margins are often wafer thin and net profitability is frequently lower than 3%, this causes major concerns for

growers. Although automation has often been cited as a solution, industry experts believe that practical automation solutions are 5-10 years' away and requires heavy capital investment which many growers would be unable to afford.

Table 8-7: Projected Brexit Impact Analysis - Scottish Cauliflower Enterprise (£ per Hectare)

Parameter	19/20 (Base)	FTA		No Deal		No Deal (with 20% Labour Cost Increase)	
	£/Ha	£/Ha	% Ch.	£/Ha	% Ch.	£/Ha	% Ch.
Yield (t/ha)		16		16		16	
Price (£/t)	420	427	+1.6%	444	+5.6%	444	+5.6%
Output	6,720	6,828		7,096		7,096	
Total Variable Costs^①	3,867	3,978	+2.9%	4,223	+9.2%	4,321	+11.7%
Gross Margin	2,853	2,850	-0.1%	2,873	+0.7%	2,776	-2.7%
Net Margin^②	202	199	-1.5%	222	+10.1%	125	-38.2%

Sources: Farm Management Handbook (2019/20), Agricultural Budgeting and Costing Book, Andersons
^① Variable costs are primarily based on Scottish Farm Management Handbook, but as these do not include casual labour, costings from the Agricultural Budgeting Costing Book (90th edition) have been used to provide indication of Brexit impact. ^②Assumes a Base net margin of 3% based on primary research, actual margins frequently lower.

8.6.3 Broccoli

Similar to the cauliflower analysis, Table 8-8 summarises the projected Brexit impacts under each scenario. Most of the assumptions applicable for cauliflowers above are also applied to broccoli. Once again, estimates on output and most variable costs are based on the Farm Management Handbook 2019/20, with casual labour costs coming from the ABC Book.

Table 8-8: Projected Brexit Impact Analysis - Scottish Broccoli Enterprise (£ per Hectare)

Parameter	19/20 (Base)	FTA Deal		No Deal		No Deal (with 20% Labour Cost Increase)	
	£/Ha	£/Ha	% Ch.	£/Ha	% Ch.	£/Ha	% Ch.
Yield (t/ha)		10		10		10	
Price (£/t)	600	610	+1.6%	634	+5.6%	634	+5.6%
Output	6,720	6,096		6,336		6,336	
Variable Costs^①	3,867	3,355	+3.7%	3,580	+9.8%	3,670	+12.6%
Gross Margin	2,853	2,741	-0.9%	2,756	+0.6%	2,666	-2.7%
Net Margin^②	180	180	-0.1%	196	+8.7%	106	-41.3%

Sources: Farm Management Handbook (2019/20), Agricultural Budgeting and Costing Book, Andersons
^① Variable costs are primarily based on Scottish Farm Management Handbook, but as these do not include casual labour, costings from the Agricultural Budgeting Costing Book (90th edition) have been used to provide indication of Brexit impact. ^②Assumes a Base net margin of 3% based on primary research, actual margins frequently lower.

Under an FTA, projected gross margins decline by 0.9%, whilst a 0.6% rise is projected under a No Deal. When casual labour costs are assumed to rise by 20%, this results in a 2.7% gross margin decline.

When a Base net margin of 3% is again assumed, significant declines are projected under an FTA scenario and a No Deal (20% casual labour cost increase), whilst profitability is projected to rise by almost 9% under a core No Deal scenario. As with cauliflowers, Scottish broccoli growers are heavily exposed if Free Movement ends and there is an inadequate SAWS scheme to meet seasonal labour requirements.

8.6.4 Strawberries

As the Farm Management Handbook for 2019/20 does not contain strawberries' gross margin information, the estimates in Table 8-9 are based on gross margins from the ABC Book as well as primary research input. Whilst these figures are not necessarily based on Scottish strawberries' enterprises, they still capture the major labour-related challenges associated with Free Movement ending.

In addition to the direct impacts on labour, reduced labour availability is also likely to affect transport costs with increases assumed to be around half the projected labour cost increase under each scenario. See Annex IV for more detail. Overall, only a small (2%) increase in variable costs is anticipated under and FTA, whilst cost increases of 7.3% to 9.4% are envisaged under No Deal. Whilst gross margins decrease under all Brexit scenarios, the smallest decline (-4.1%) is projected under a core No Deal where output price rises (5.3%) mitigate increased labour costs. However, if labour costs rise by 20%, net margins would plummet by over 80%, almost wiping out any net margin in this case. This again illustrates the concerns over labour in the horticultural sector.

Table 8-9: Projected Brexit Impact Analysis - Scottish Strawberries Enterprise (£ per Hectare)

Parameter	19/20 (Base)	FTA Deal		No Deal		No Deal (with 20% Labour Cost Rise)	
	£/Ha	£/Ha	% Ch.	£/Ha	% Ch.	£/Ha	% Ch.
Yield (t/ha)	30	30		30		30	
Price (£/t)	3,500	3,507	+0.2%	3,686	+5.3%	3,686	+5.3%
Output	105,000	105,210		110,565		110,565	
Total Variable Costs	86,364	88,077	+2.0%	92,694	+7.3%	94,464	+9.4%
Gross Margin	18,637	17,133	-8.1%	17,871	-4.1%	16,101	-13.6%
Net Margin^①	3,150	1,647	-47.7%	2,384	-24.3%	614	-80.5%

Sources: Agricultural Budgeting and Costing Book, Andersons

① Assumes a Base net margin of 3% based on primary research, actual margins frequently lower.

8.7 CONCLUDING REMARKS

Overall, the analysis shows how crucial an influence labour has on the overall profitability and performance of the Scottish horticultural sector. Whilst the analysis above suggests substantial profitability declines under a No Deal Brexit and insufficient labour to meet requirements, businesses contributing to this study emphasised that it may not be possible to undertake horticultural operations if seasonal labour becomes seriously curtailed. The strong message emanating from the research is that with an expanded SAWS scheme that meets the needs of the UK agricultural and horticultural sector, estimated at approximately 70,000 workers across the UK, then the futures of these businesses could be safeguarded. They will then be able to concentrate on exploiting potential opportunities arising from Brexit which primarily focus on capturing a greater share of the domestic UK market.

Businesses contributing to the research also mentioned that the impact of the Covid Crisis and National Living Wage have already led to significant cost increases. Add a No Deal Brexit with curtailed labour availability on top of this, then many businesses will be unable to survive in the long-term.

9. CONCLUSIONS AND FINAL REMARKS

This study shows that the potential impacts of Brexit on Scottish farming are complex and require a nuanced analysis. Especially concerning a No Deal where there are divergent ramifications for different sectors. With this in mind, the study's key conclusions are set-out below.

9.1 KEY CONCLUSIONS

1. **An FTA results in relatively small changes to output:** as shown in Table 9-1 a UK-EU FTA would lead to relatively minor changes to Scottish agricultural output, as there would only be small effects on trade with the EU and UK consumption. Any changes that do occur are primarily due to NTMs. The NTM AVEs calculated in this project tend to be lower than previous studies and are predicated on the UK's standards being the same as the EU's. This leads to lower checking rates by regulatory authorities. Any future divergences in standards are likely to bring about increased checking rates by customs authorities and lead to increases in NTM costs.
2. **A No Deal will lead to more dramatic and divergent effects on output:** much will depend on whether the UK is a net exporter or net importer. For sectors reliant on exports (e.g. lamb and barley, which are important in Scotland), significant declines are forecast due to severe price reductions, especially lamb. Where the UK is a net importer (e.g. beef and dairy) output is projected to rise markedly (14-17%). For wheat, where the net trade position is more marginal, a small output increase is forecast but this is chiefly due to the relative decline of profitability in barley production. As it was not possible to undertake a full-scale modelling analysis for the horticultural sectors using Agmemod, the projected changes in Table 9-1 are due to trade barriers, including tariffs under a No Deal. Aside from seed potatoes (-4.6%), all other sectors are projected to grow by over 5% under No Deal. However, as discussed below, this is heavily reliant on sufficient labour availability.
3. **Overall output projected higher in both Brexit scenarios:** across all the sectors examined in this study, output is forecast to rise by 4.1% under No Deal, whereas the increase in an FTA scenario is just 0.6%. These shifts, particularly in the FTA scenario, are well within the ranges witnessed in previous years just from weather, commodity and exchange rate shifts. For the sectors modelled via Agmemod, the short-term rise from a No Deal is 4.3% (vs 0.7% (FTA)). In 2025, No Deal gains dissipate somewhat to 2.4%, mainly driven by further declines in the sheepmeat and barley sectors.

Table 9-1: Estimated Short-Term Impact of Brexit on Selected Scottish Farm Sectors (£m)

Sector / Commodity	Base 2017-19	FTA 2021		No Deal 2021	
	£m	£m	% Ch	£m	% Ch
Wheat	121	121	0.0%	123	2.0%
Barley	269	269	0.0%	241	-10.3%
Beef	575	581	1.1%	672	16.9%
Sheepmeat	213	215	1.0%	152	-28.5%
Liquid Milk	384	386	0.6%	440	14.6%
Sub-Total	1,562	1,573	0.7%	1,629	4.3%
Seed Potatoes*	76	75	-1.9%	73	-4.6%
Potatoes – Ware*	146	147	0.6%	155	5.9%
Cauliflower*	6	6	1.6%	6	5.6%
Broccoli*	10	10	1.6%	11	5.6%
Strawberries*	95	95	0.2%	100	5.3%
Total	1,895	1,906	0.6%	1,973	4.1%

Sources: Andersons, WUR and Scottish Government

* Not modelled using Agmemod, estimates based on tariff and NTM price changes applied to 2017-19 output.

4. **FTAs with third countries or generous new TRQs will erode output gains:** although this study did not specifically model the impact additional FTAs which the UK might agree with other countries, most notably the US, Australia and New Zealand, it is evident that any additional exposure to global competitors whose cost bases are lower and operate to different standards, will exert pressure on Scottish producers. Although the imposition of a new 196Kt TRQ for beef did not diminish output under a No Deal scenario, this was in a large part due to this TRQ simply replicating the existing net trade position with the EU. Importantly, it was also assumed that the UK's existing standards (i.e. aligned with the EU's) were still in place. As such, there were still linkages with the EU market. Changed standards as a result of new FTAs would mean greater exposure to world market prices and an erosion of prices, thus lowering output considerably. This would be most prevalent in beef but likely to have some effects on dairy products as well.
5. **Minimal consumption changes in an FTA, but some reactions to No Deal price effects:** the biggest consumer reaction occurs with lamb where No Deal price declines (26-27%) leads to a significant (35-37%) upturn in domestic usage. This reaction is also aided by the fact that substitute meat products such as beef, pork and poultry would become more expensive under No Deal. Beef and dairy products post relatively small consumption declines in reaction to No Deal price increases. The pronounced reaction in lamb is also a function of the relatively small amounts currently consumed in the UK as it equates to about a fifth of beef consumption and a tenth of poultry meat domestic usage.
6. **Divergent impacts on farm-level profitability:** given the Agmemod results above, it is unsurprising that dairy and beef farming become more profitable under both scenarios. In an FTA where declines in sheepmeat prices are small, margins in both LFA and Lowland farms improve. Under a No Deal, the situation on LFA cattle and sheep farms deteriorates rapidly due to price falls in sheepmeat. Lowland farms continue to see improved margins but that is heavily reliant on beef prices remaining high. Margins on Scottish cereals farms deteriorate under both scenarios due to the impacts on barley, where significant losses are projected under a No Deal.
7. **Inflationary pressures on inputs:** for imported inputs from the EU27, trade barriers will exert inflationary pressures, particularly on farm-level inputs as it takes time for supply-chains to adapt to regulatory changes. With tight industry profit margins, it is likely that much of the additional costs will be passed on to consumers and/or farmers. As demonstrated above, the degree to which Scottish farming could absorb such costs is limited. If farmers bear the brunt of price pressures, a significant proportion could be squeezed out of farming under a No Deal.
8. **If seasonal labour is unavailable, many horticultural enterprises will become unviable:** the results in Chapter 8 suggest that if Free Movement ends and seasonal labour costs rise by 15-20%, horticultural profit margins decline considerably. However, more fundamentally, primary research feedback states that without seasonal labour, many enterprises will simply be unable to operate with obvious severe ramifications for the Scottish horticultural industry. It is evident that an expanded Seasonal Agricultural Workers' Scheme is required. Across the UK, this needs to be in the region of 70,000 workers, with over 9,250 seasonal workers needed in Scottish horticulture alone.
9. **Labour needs in food processing also need addressing:** this issue is most prevalent in red meat where there is a heavy reliance on migrant labour. Whilst most workers will be in a position to achieve Settled Status, there will be challenges in recruiting new workers. Getting skills such as butchery onto the Shortage Occupation List has helped somewhat as has a relaxing of the salary thresholds. However, significant challenges remain and industry needs greater certainty on this issue which has increased in importance versus other Brexit issues in the last 1-2 years.

10. **Uncertainty about future border arrangements:** despite a significant increase in announcements recently from Defra and other Government agencies, many businesses are still uncertain as to what additional regulatory requirements will be placed upon them post-Brexit. This is particularly the case for trade into Northern Ireland where border controls are set to be in place from January, but is also an issue elsewhere, especially Dover-Calais. Detail is urgently needed on these arrangements and the general view is that although the Transition Period might end in December, a further 6 months is needed to phase in future arrangements. If these issues are not addressed, then significant upheaval will ensue in the first few months of 2021. This is likely to result in severe delays and will lead to a more substantial impact of NTMs. This would damage continental customers' confidence in being able to reliably source UK and Scottish produce, particularly perishable meat products. This would erode trust which, once lost, would be difficult to gain back.
11. **Non-EU markets are not going to sufficiently replace EU export markets:** this is because the UK/Scotland is a high-quality (and high-cost) producer, so opportunities for meat and dairy products are likely to be limited to niche markets such as Japan. This will not replace the significant value of exports to key EU markets if these are lost under a No Deal scenario. The industry view is that non-EU markets are bonus opportunities, but that safeguarding Scotland's share of the UK market and exports to the EU need to be prioritised.
12. **The UK Internal Market is still the most important for Scotland:** this point was emphasised numerous times during the primary research. Several mentioned that Brexit should present opportunities to serve a greater proportion of the UK market, although this was likely to be marginal in an FTA scenario. A No Deal would present greater opportunities for Scottish producers to increase sales in the UK Internal Market where Britain is a net importer. However, there are fears that the UK will use agriculture as a pawn in trade negotiations and that the protection offered by the UKGT (which most participants welcomed) will be undermined when the UK signs new FTAs with the likes of Australia, New Zealand, the US or even Mercosur. This is coupled with fears that future changes to standards will make it more difficult for Scottish producers to compete, thus limiting domestic market opportunities even further. Some also expressed the view that Scotland should not simply follow EU standards if this meant that its competitive position in the rest of the UK was undermined. This suggests that there is an important balancing act for the Scottish Government to ensure that current standards and reputation of Scottish produce is upheld whilst not undermining its position in both the British and EU markets.
13. **Disproportionate impact on SMEs:** smaller businesses are likely to have higher operating costs and dispatch fewer loads than their largescale peers. Due to the time burden involved with getting Special Economic Authorisations such as AEO status, which have not really been taken-up by SMEs, such firms are likely to be seen as a higher risk by regulatory authorities. Therefore, they would be subject to additional checks which would exert a higher toll as their risk would be spread across fewer loads on a yearly basis. As such, trade barriers would have a greater impact on their bottom-lines, meaning that it is more likely that such businesses would stop trading internationally. If alternative markets cannot be found domestically, they could exit the industry. In future, this could mean less competition and reduced choice.

9.2 FINAL REMARKS

Scottish farming stands on the cusp of the most significant change in generations. Coupled with the impact of coronavirus, the challenge of climate change and net-zero as well as potential changes in agricultural support in 2025, the 2020's are set to become the "transition decade" for Scottish

agriculture. As the Brexit Transition Period ends, there will be significant changes to Scotland's trading relationship with the EU (and NI). These can be minimised via an FTA, and improved upon in the years ahead. If there is No Trade Deal, whilst the results show that there will be positive impacts, these are highly uncertain, and are likely to be eroded by future trade deals. Given the negative impacts in sheep and barley, which are much more important in Scotland than the UK generally, the viability of many Scottish farm businesses will be jeopardised under a No Deal. This will have severe ramifications for regions heavily reliant on these sectors.

Whilst trade with the EU is undoubtedly important, the UK internal market remains the most crucial for Scottish producers. Any divergence in standards within the UK would also cause upheaval. It is crucial that the future standards that operate within each devolved region are predicated upon an agreed baseline which gives Scottish farmers the chance to compete on a level playing field, both internally within the UK and with their peers in the EU. If such standards are formulated intelligently, they could also help to safeguard the high-quality reputation and integrity of Scottish agri-food produce. This will be crucial in protecting existing sales and capturing high-end opportunities more globally in future.

Although Brexit brings uncertainty, the Scottish agricultural industry has experienced significant crises in the past. However, the situation is complicated by the fact that it is navigating through another crisis with Covid-19. Farmers and the agri-food industry generally have the ability to adapt provided the playing field is fair. Irrespective of the political aspects of Brexit, which this study has sought to avoid, there is merit in a close collaborative partnership between like-minded economies, be that within the UK, the European continent, on a transatlantic basis, or more globally. This is especially so for countries that have worked together for decades and have come through numerous crises in the past.

Globally, the agricultural sector has more to gain by working together to address and overcome the challenges ahead (e.g. climate change, biodiversity crisis, feeding a planet of 9-10 billion people). Bumps along the road, of which Brexit is certainly one, will occur. These can only be overcome through collaboration, respect and due regard for the rule of law.

10. ACRONYMS AND ABBREVIATIONS

ABC	Agricultural Budgeting and Costing (Book)
AEO	Authorised Economic Operator (<i>a quality mark that shows your role in the international supply chain is secure and your customs controls and procedures are efficient and meet EU standards</i>)
AFBI	Agri-Food and Biosciences Institute
AHDB	Agriculture and Horticulture Development Board
APHA	Animal and Plant Health Agency
ASF	African Swine Fever
AVE	<i>Ad-Valorem</i> Equivalent
BCP	Border Control Post (Previously called Border Inspection Post (BIP))
CET	Common External Tariff
CETA	Canadian, European Trade Agreement
CAP	Common Agricultural Policy (of the EU)
CVED	Common Veterinarian Entrance Document
DEFRA	Department of Environment, Food and Rural Affairs
DPE	Designated Port of Entry
ECB	European Central Bank
EEA	European Economic Area
EEC	European Economic Community
EHC	Export Health Certificate
EU	European Union
EORI	European Operator Registration and Identification Scheme (<i>an EORI number is required to trade goods with countries outside the EU</i>)
ESRC	Economic and Social Research Council
FAPRI	Food and Agricultural Policy Research Institute (economic model)
FBI	Farm Business Income
FTA	Free Trade Agreement
GB	Great Britain
GDP	Gross Domestic Product
GVA	Gross Value Added
HMRC	Her Majesty's Revenue and Customs government-department
HS	Harmonised System
HTS	Harmonized Tariff Schedule (used by the US)
IPAFFS	Import of Products, Animals, Food and Feed System
JIT	Just-in-Time
LoLo	Lift-on, Lift-off
MFN	Most Favoured Nation
MRA	Mutual Recognition Agreement
NI	Northern Ireland
NCH	National Clearance Hub
NFUS	National Farmers' Union, Scotland
NTB	Non-Tariff Barrier

NTM	Non-Tariff Measure
NZ	New Zealand
OECD	Organisation for Economic Cooperation and Development
OSR	Oilseed rape
PHA	Port Health Authorities
POAO	Products of Animal Origin
QMS	Quality Meat Scotland
ROI	Republic of Ireland
RoO	Rules of Origin
RoRo	Roll-on, Roll-off
ROW	Rest of World
SASA	Science and Advice for Scottish Agriculture
SAWS	Seasonal Agricultural Workers' Scheme
SPS	Sanitary and Phytosanitary (Measures)
SSG	Special Safe-Guard
TBT	Technical Barriers to Trade
TIFF	Total Income from Farming
ToR	Terms of Reference
TRACES	Trade Control and Expert System (<i>vet certification tool used by the EU to control the import and export of live animals and animal products within and without its borders</i>)
TRQ	Tariff Rate Quota
TSS	Trader Support Service
UK	United Kingdom
UKGT	UK Global Tariff
UNCTAD	United Nations Conference on Trade and Development
UN FAO	Food and Agriculture Organisation of the United Nations (UN)
US	United States (of America)
USITC	United States International Trade Commission
UTL	Unilateral Trade Liberalisation
WTO	World Trade Organisation
WUR	Wageningen University and Research

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